THESIS FOR M.D.

THE USE OF THE X RAYS IN THE DIAGNOSIS OF ANEURISMS OF THE THORACIC AORTA, DILATATIONS OF THE AORTA AND MEDIASTINAL NEW GROWTHS.

BY

H. MAUGHAN BROWN.

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The material on which this thesis is based has all been got from the Royal Infirmary, Edinburgh. The cases have all been under the charge of Dr. Bramwell, and a large number of them have personally come under my own observation.

The examination by means of the X rays has been made in the electrical department of the above institution by the medical staff in that department.

The aim of this thesis is to show, by the illustration of the cases which have come under observation during the last 5 or 6 years, what results are obtained on X ray examination and what is its bearing upon the diagnosis of cases.

First of all then we will describe briefly the technique of the operation entailed in making an examination.

It is unnecessary to enter into a discourse on the various methods of producing the X rays - it is enough to state that they may be produced by a Static machine or an induction coil.

Various forms of tubes are used, those in which there is a mechanism for regulating the vacuum in the tube being the best for our purposes.

The other part of the apparatus consists in either an ordinary photographic plate or a fluorescent screen.

The screen consists of a piece of cardboard coated on one side with a thin layer of crystals of barium platino-cyanide. These give off a yellowish green fluorescence.

The cardboard is supported in a wooden frame and covered on the non-fluorescent side with a layer of black cloth to prevent the light produced by the fluorescence of the glass tube from disturbing your eyes while examining the patient.

The size of the screen should be not less than 11 x 14 ins.

Both the radiograph and the screen are of service in the examination. The latter is much the more important in examining conditions intrathoracically for the movements of the object under examination may be determined. The plate gives more accurate results - it shows details which the screen does not give. The screen is more useful in that you can observe the parts from different points of view and so obtain valuable information. With the screen you obtain your results at once

and have not to wait until the plate is developed.

The plate is a useful means of recording the size of the lesion but various factors have to be taken into consideration to render this record in any way accurate for future comparison.

To obtain accurate records one must note the time of exposure; the milliamperage of the current going through the tube; the distance of the tube from the plate; the position of the tube with regard to the patient; and the position of the patient.

In making a screen examination you require a tube with a considerably higher degree of penetration than would be necessary in a radiographic record and so the same tubes are not suitable for use in both cases.

The thickness and muscular development of the patient modifies the amount of penetration required.

The power of penetration within certain limits must be increased for very thick and muscular persons.

The degree of penetrative power in the same tube varies with its degree of electrical resistance and this varies with the degree of vacuum within the tube. The higher the vacuum, the greater the resistance and the more penetrative the rays.

From M. D'Arsonval's experiments it would appear that for a tube of given vacuum the quantity

of X rays emitted is proportional to the milliamperage; the increase in the penetration of rays is proportional to the increase in the voltage.

The light should not be too strong and must be perfectly steady.

The best position is to have the patient standing because his position can be easily changed and respiration is least interfered with thus.

The distance of tube from patient varies, depending partly on the power of the rays, and partly on the thickness of the patient. The tube should not be nearer to the patient than 12 - 15 ins. otherwise severe burns may ensue, if exposure be for too long a time.

To avoid undue distortion of the shadows it is well to have the distance not less than 2 feet. It has been shown by Dr. Cowl that at this distance the amount of distortion is not enough to cause serious error.

The rays should fall as nearly as possible at right angles to the plane of supposed lesion.

The observer should remain in absolute darkness for some little time before commencing a screen examination in order to acquire as great a retinal sensibility to the fluorescence of the screen as possible.

Béclère says, "My own experimental observations

have proved by precise measurement that after 10 minutes in the dark the sensibility of the retina to the light of the fluorescent screen has become 50 to 100 times greater than it was on emerging from broad daylight; it is about 200 times greater after 20 minutes and after a longer interval it still increases."

The patient must be stripped to the waist.

Having discovered the method of obtaining the result and indicated the precautions to be taken, we may now pass on to describe the appearances seen.

In the normal chest, from the front or back, there are three zones to be seen, -

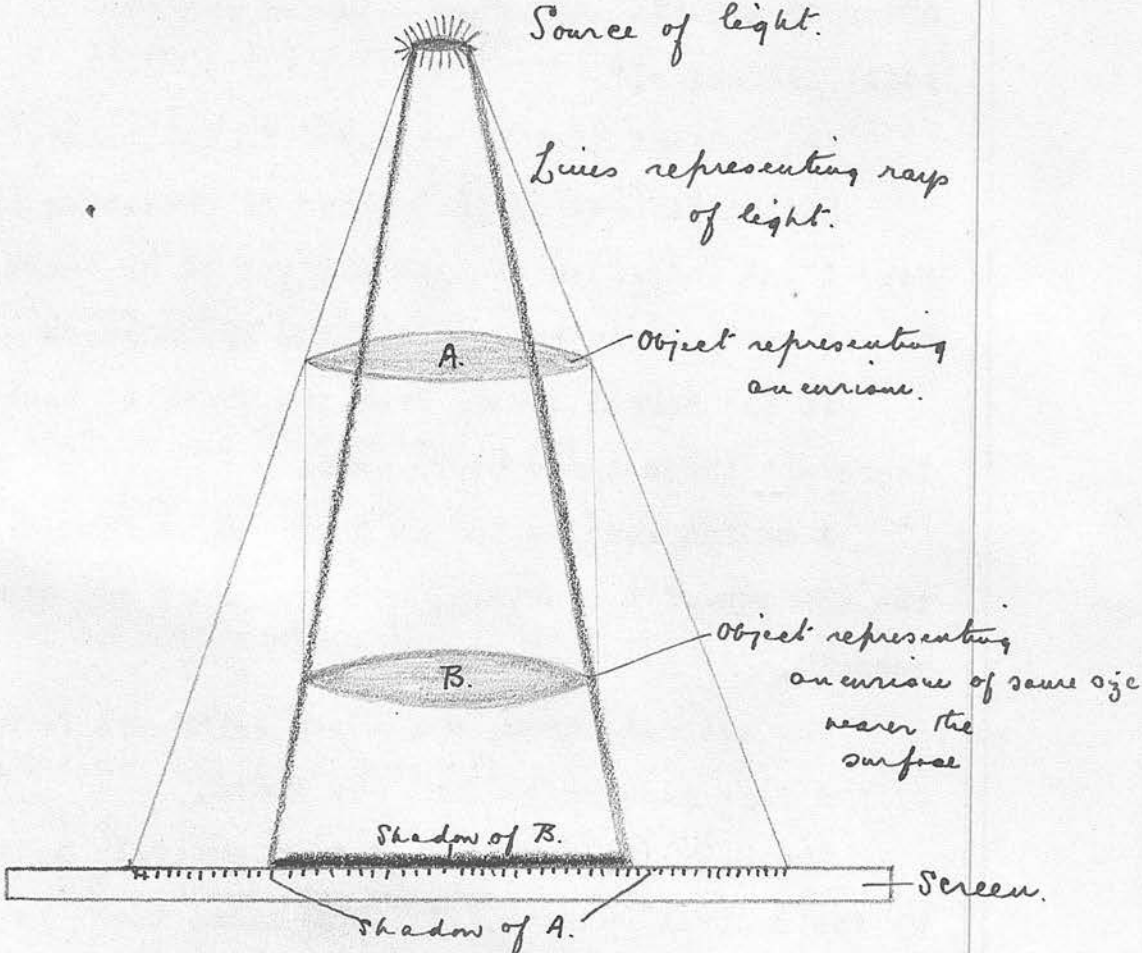
A median zone, which is dark and is formed by the shadows of the spines, sternum, heart and great vessels.

Two lateral zones, which are light and formed by the rays passing through the lungs.

The normal aorta is almost or entirely masked by the central opacity. In some cases there is a slight bulge on the left side due to the bend of the aorta to the left as it passes backwards.

In thoracic aneurisms certain dark shadows will be seen projecting to the right or left or both sides of the central opacity. The size of these will vary with the size of the aneurism, other things being equal.

Fig. 1.



Shadow of object nearer the surface is smaller & more defined than that of an object further away.

The edges of these shadows may be sharp, or rounded. Very often distinct pulsation is seen, expansile in character. These shadows will of course always be exaggerated, the amount of exaggeration varying with the distance of the sac from the chest wall.

This will be readily understood when it is remembered that the rays of light come from a focus and radiate outwards. Fig. 1.

The nearer an aneurism is to the surface the clearer will be its outline and the less exaggerated the margin of its shadow.

The depth of the aneurism from the surface may be gauged by examining the patient from the anterior and posterior aspects. If a shadow is more clearly outlined on one surface than on the other, it may be presumed that the sac is nearer that surface on which its shadow is the smaller.

The density of the shadow will vary partly with the size of the aneurism and partly with the amount of laminated clot. The greater the amount of organised clot the denser the shadow.

In a large number of cases of aneurism pulsation is made out with difficulty and often cannot be observed. This cannot be wondered at for there may be great thickness of the walls brought about by chronic inflammation on the outside of the sac or by organisation of the clot within.

Pulsation is more often seen in general dilatation of the aorta especially if there is aortic incompetence as well.

Permanent records of the shadow cast on the screen may be taken by tracing with a skin pencil the outline of the shadow on the surface of the body and afterwards transferring this on to some tracing paper. It is best to use a pencil with metal going right up to the point so that the shadow of it is cast and you can see exactly where you are marking.

In taking a radiograph the patient is usually laid on a flat surface with the chest and back bare so that no shadows may be cast from buttons. Under him the plate is put wrapped up in two envelopes, an inner one of black paper and an outer of orange, or only black envelopes may be used.

The tube is placed about 2 feet above the level of the chest wall. The room is not darkened.

The duration of exposure depends on a large number of factors:-

(1) The exciting apparatus used.

(2) The efficiency of the tube.

(3) The thickness of the patient.

(4) The sensitiveness of the plate.

(5) The distance of the tube from the plate &c.

These factors are so variable that it is impossible

to give definite rules for the length of exposure.

The time usually employed in the R.I.E. is about 5 minutes for thin persons, 6 to 6½ minutes for stout persons.

Rays of low penetration have the greatest effect on plates, and so it is better to employ a tube of lower penetrative power than you would use in screen work.

After the photo is taken the plate is developed in the usual way.

Having explained the technique, we now proceed to give a series of cases with the results of X ray examination.

In some of the cases tracings of shadows are shown. These have been copied from tracings taken from the body from pencil markings made in the X ray department outlining the shadow.

In some of the cases prints of radiographic plates are shown. We may group these cases roughly into 5 classes.

Class 1.
Cases with marked symptoms and signs pointing to Aneurism.

Class 2.
Cases with a few symptoms and signs pointing to an Aneurism.

Class 3
Cases with few, if any, symptoms and signs pointing to an Aneurism.

Class 4
Cases of Dilatation of the Aorta.

Class 5
Cases of Mediastinal New Growth.

Class 1. Cases with marked symptoms and signs pointing to an Aneurism. Cases 1 - 8.

Aneurism of Transverse part of Arch.

CASE 1.

P. L., 44, Warehouseman,

Admitted January, 31st, 1904.

Complaint - Swelling in the neck - pain in swelling and running down into arm and in breast.

History - His voice has been hoarse for 2 years. Gnawing pain in left shoulder and down left arm for 2 years. Difficulty in swallowing started 9 months ago. Three months ago began to spit up blood. Swelling in neck started 5 weeks ago and has grown rapidly since. Has had a cough and spit for 2 years. Has lost 2 st. 4 lb. during this time.

Previous health, etc. - Syphilis 20 years ago. Temperate.

On admission. - Pulse regular tension moderate, walls thickened. Pulses equal and synchronous. Right carotid more forcible than left.

P.L. Feb 4th 1904.

Shadow of Aneurism.

Radiograph of Aneurism.

There is an expansile pulsating swelling behind manubrium sterni and extending up into neck and to the left. Dulness in percussion over this area.

A systolic aortic murmur.

Aortic 2nd sound accentuated.

Systolic murmur heard over the tumour.

Tracheal tugging. There is impairment of movement of left vocal cord.

Pupils equal.

X rays - There is a distinct opacity, pulsating in region of arch of aorta.

Aneurism of the Aortic Arch.

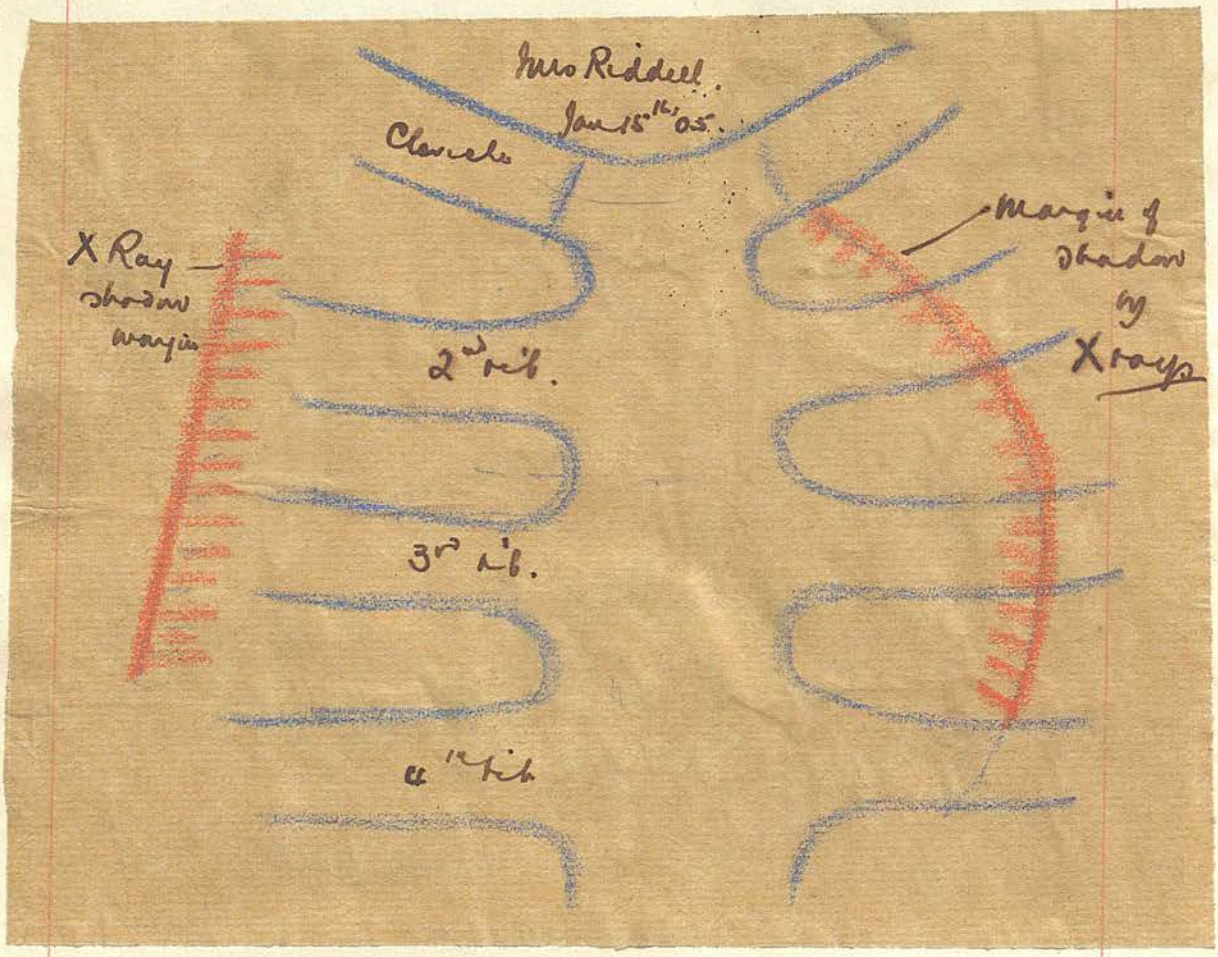
CASE 2.

Mrs R. 45.

Admitted January 14th, 1905.

Complaint - Pain in chest, shortness of breath, worse on exertion.

History - Three months ago she was seized with a severe pain over the heart whenever she exerted herself. The pain was gripping and seemed to take her breath away. It shot to the back and down left arm. Soon afterwards her voice became hoarse, and about same time felt as if her food were sticking about lower level of manubrium sterni, at same time feet and ankles became swollen. Has lost 2 stone in weight during this time.


Miss Riddell.
Jan 15th 05.
Clavicle
X Ray shadow margin
2nd rib.
3rd rib.
4th rib
Margin of shadow by X rays

Previous health, etc. - Rheumatic Fever 27 and 15 years ago.

No specific history but had four miscarriages before she had a living child.

On admission - Hoarseness and dysphagia as in history.

Pulse regular, tension moderate. Arteries not thickened. Right pulse much stronger than left. Pulses synchronous. Dulness on percussion in aortic area, 2¼ ins. to right and 1¾ to left of middle of sternum at level of 2nd rib. Slight pulsation in this area. A systolic aortic murmur. Aortic 2nd sound accentuated.

No tracheal tugging. Left vocal chord slightly affected. Cough rather brassy.

Pupils, left 6 m.m., right 5 m.m.

Slight anaemia, no Leucocytosis.

P. improved somewhat under treatment - area of dulness diminished.

X Ray - There is a marked shadow extending to the right and left of sternum - see chart.

Aneurism of the Aorta.

CASE 3.

Mrs B., 47.

Admitted January 28th 1905.

Complaint - Shortness of breath and pain in chest on exertion.

History - One night about a year ago she was suddenly seized with pain in her throat and difficulty in swallowing. The food seemed to stick at a point opposite midsternum. This continued for 5 months. She was free of difficulty in swallowing for 2 months. Then it came on again and the shortness of breath which had been present since commencement of illness got worse. Her feet began to swell. Pains began to shoot from the heart into left shoulder and down left arm.

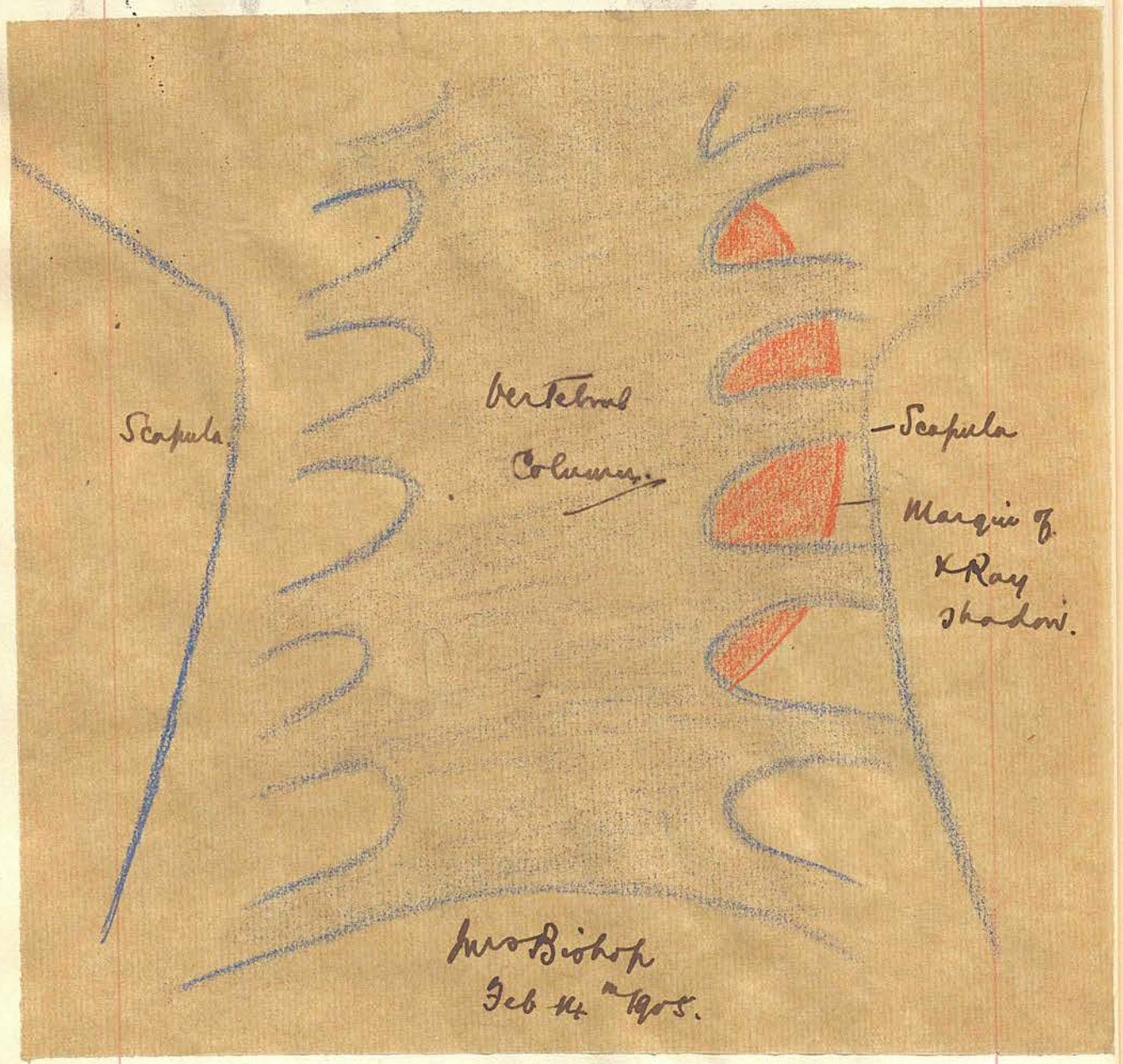
Previous health, etc. - No specific history. Temperate. No hard work.

On admission - Pulse regular, tension moderate. Arteries not thickened. Right pulse stronger than left but pulses are synchronous.

Pulsation in suprasternal notch. Heart not enlarged.

A faint systolic aortic murmur. Aortic 2nd sound accentuated.

Some dulness over manubrium and a little to the left. No pulsation in aortic region. No tracheal tugging. No


Scapula.
Vertebral Column.
Scapula
Margin of X Ray shadow.
Mrs Bishop
Feb 4th 1905.

hoarseness. Vocal cords normal.
Pupils equal.

X Ray - There is a distinct opacity extending to the right of spinal column. This is believed to be the margin of an aneurism.
From the front there is a denseness behind and slightly to either side of the sternum.

Aneurism of Aorta.

CASE 4.

P. McM., 48, Ships' rigger.
Admitted September 11th 1905.

Complaint - Painful swelling in region of manubrium sterni and right side of neck. Hoarseness &c.

History - Five years ago he began to have severe pain, worse on exertion, over manubrium sterni. Sometimes he felt the pain in left breast, shooting up into to left shoulder and down left arm. Two years ago first noticed a small swelling in region of manubrium. Two months ago swelling rapidly became larger and pain began to shoot up into right side of neck. For 2 years has been hoarse, and has noticed that often his left hand is much bluer than right.

P. McM.
Sept. 25th 1905.

Shadow of Aneurism of Aorta.

Heart shadow at lower left hand line.

Radiograph of Aneurism.

Previous health, etc. - No specific history.
Pretty hard work. Somewhat alcoholic.

On admission - Left hand bluer and colder than right. Face cyanosed. Pulse regular. Left pulse is much smaller than right, also a little delayed.
A tumour extending from right border of manubrium to 1 in. past left border and from angle of Ludwig to about 1 in. above suprasternal notch.
Swelling projects for about 1½ ins. forward. Dull on percussion. Tumour shows expansile pulsation; it is tense and slightly tender. No murmur. Aortic 2nd much accentuated. No tracheal tugging. Left vocal cord fixed. Pupils equal. No difficulty in swallowing.

X Rays. - There is a very distinct pulsating shadow in the region of aortic arch.

CASE 5. Aneurism of the Aorta

Mrs N. 40, Charwoman.
Admitted October 26th, 1905.

Complaint - Pain in the chest, cough, loss of voice.

History - Four and a half years ago patient had

pain in chest and right arm. The right arm became swollen. Soon afterwards she had complete loss of voice. After 2 years symptoms and signs quite disappeared. Was quite well for about 2 years and then began to get weak again and fainted. Had a tight choking sensation in chest. Three days ago loss of voice and a bad cough.

Previous Health etc.- No specific history. Hard work. Temperate.

On admission - Hoarseness of voice. No dysphagia. Pulse regular, tension moderate, arteries not thickened, pulses equal and synchronous. Pulsation in suprasternal notch and also felt to right of sternum, below clavicle. Dulness in aortic region extending 2½ ins. to right of midsternum. Systolic murmur in aortic region. 2nd aortic sound markedly accentuated. No tracheal tugging. Pupils equal. Left cord slightly paralysed.

X ray - There are definite shadows showing very definite expansile pulsation as mapped out on body.

Aneurism of Ascending Arch of Aorta.

CASE 6.

Mrs N. 52. Washerwoman.

Admitted January 17th, 1907

Complaint - Shortness of breath; pains in right shoulder blade and up the neck.

History - About 18 months ago she became troubled with shortness of breath and swelling of the neck. Then a bad cough started and pains in both arms shooting down from the shoulders to the elbows. Often giddiness. Ten weeks ago began to have slight difficulty in swallowing and about the same time her voice became weaker. Swelling of upper arms a few months ago.

Previous Health etc.- Rheumatic fever 35 years ago No syphilitic history. Very hard work for last 14 years. Moderate drinker.

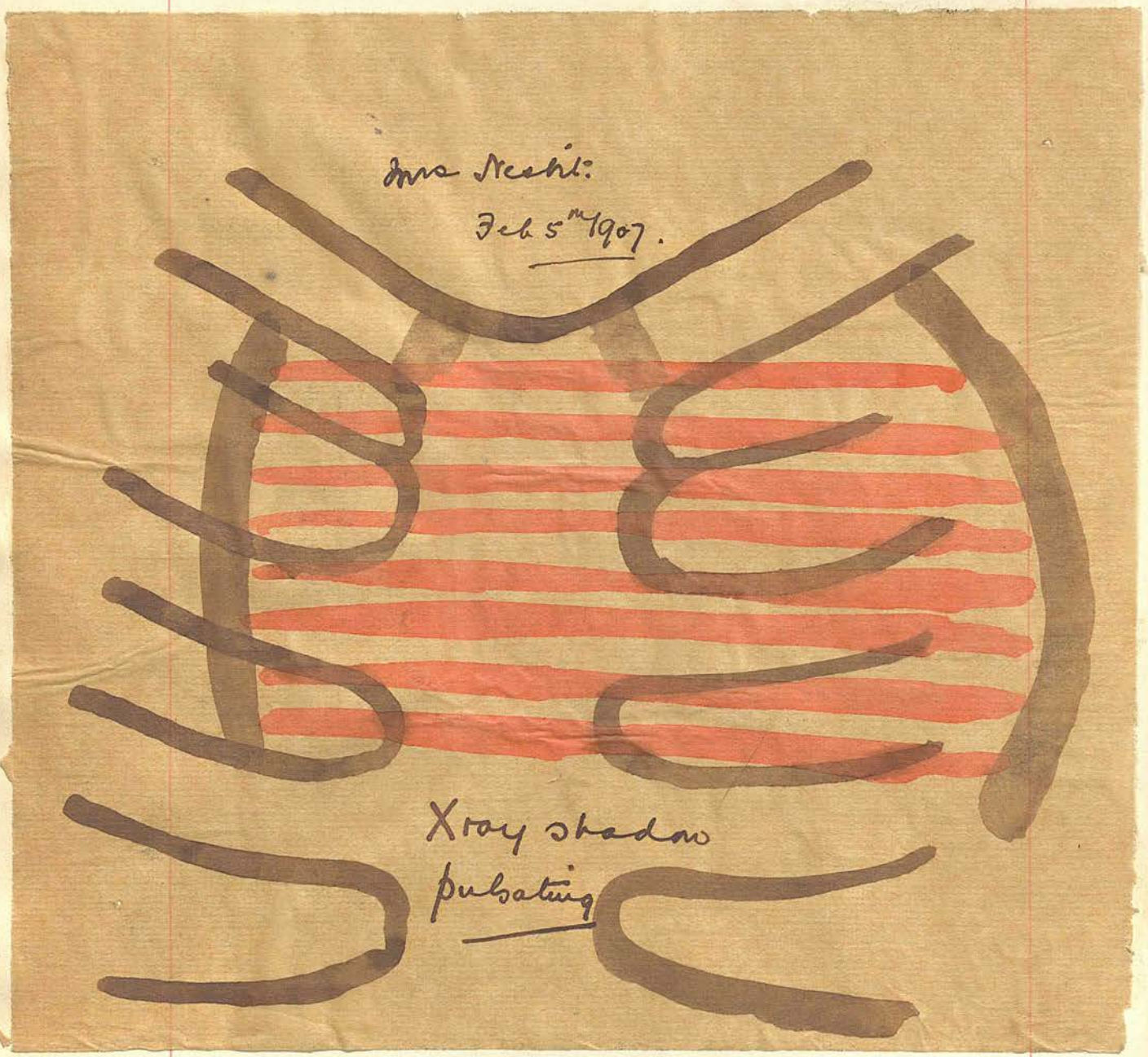
On admission - Some oedema of the face.

Pulse regular - tension fair - arteries thickened - left pulse larger than right - pulses synchronous.

Systolic and diastolic aortic murmurs.

Pulsation to right of sternum in aortic region.

Dulness in aortic region 4 ins. across extending 2 ins. to left of sternum at level of second rib.


Sara Nesbit:
Feb 5th 1907.
X ray shadow
pulsating

Expansile pulsation in supra-sternal notch.

Tracheal tugging present.

No hoarseness. No fixation of vocal cord.

Pupils equal.

X ray. - There is a large pulsating aneurism of ascending arch of aorta, size as indicated in chart.

Aneurism of Arch of Aorta.

CASE 7.

W.P. 55. Cabdriver.

Admitted January 29th, 1907.

Complaint. - Cough, choking in throat - pains over heart shooting into left arm.

Hoarseness.

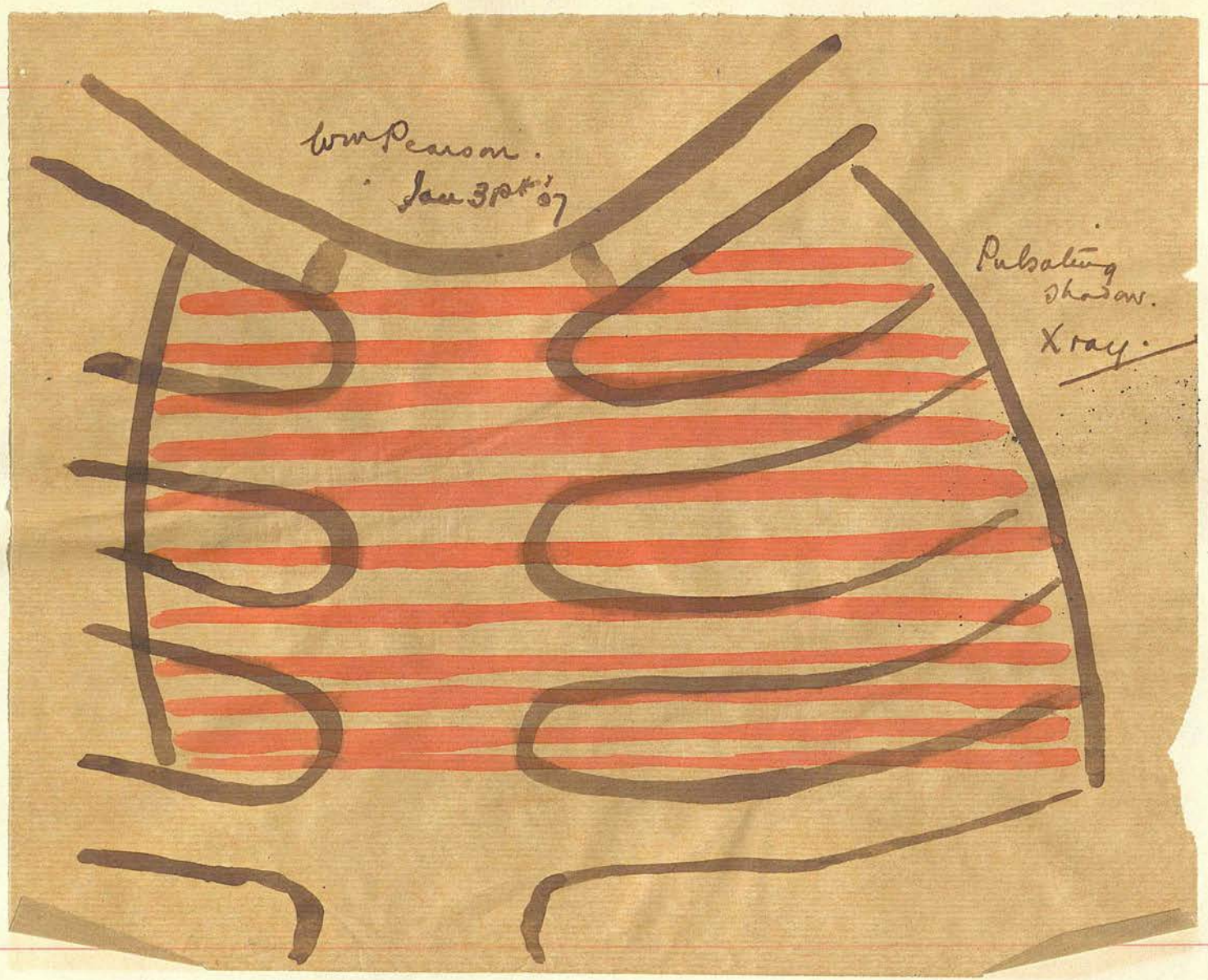
Previous Health &c. - Denies Syphilis.

History - Quite well till 7 weeks ago when he developed a bad cough and choking in the throat. Soon pains over heart shooting into left shoulder and arm started; and his voice began to get hoarse. Two or three days before admission neck became swollen. Never difficulty in swallowing.

On Admission - Symptoms as under history.

Pulse - rather high tension - arteries thickened - left slightly fuller.

Systolic aortic murmur.


Wm Pearson.
Jan 30th 07
Pulsating
Thoracic.
X ray.

L.P. Jan 31st '07

Shadow of Aneurism.

Shadow of heart extending to left.

Radiograph of Aneurism.

Thudding accentuated aortic 2nd sound.
Dulness on percussion in aortic region 4 ins.
Slight pulsation in aortic region.
Veins in chest somewhat full.
Tracheal tugging distinct.
Cough - distinctly a metallic element in cough - Left vocal cord fixed.
Pupils are equal.
Albuminuria - 2 grs. per oz. No casts.

X ray - There is a distinctly pulsatile aneurismal dilatation of aorta.

Aneurism of the Ascending Aorta.

CASE 8.

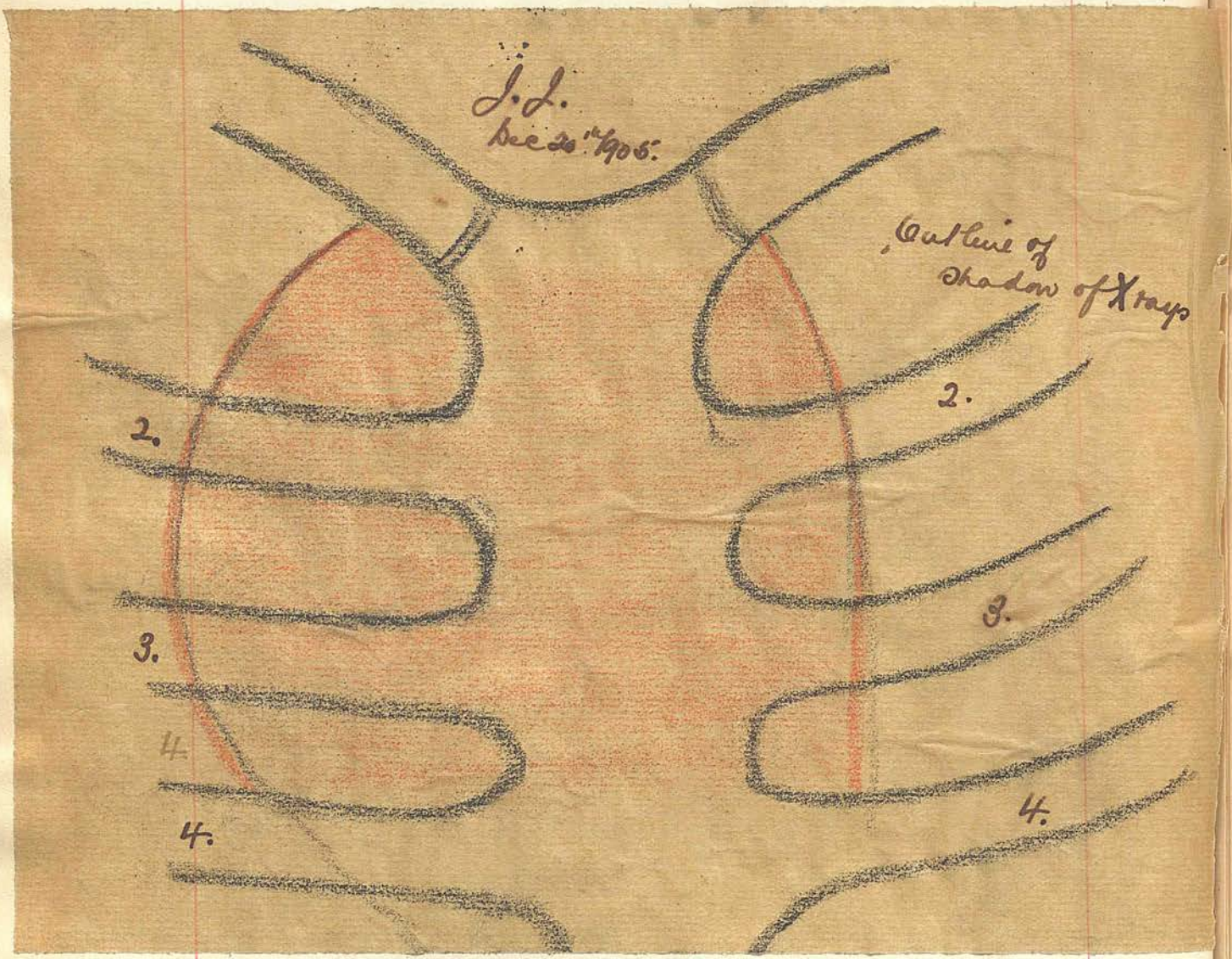
J.J. 51. Fireman.
Admitted, December 16th 1905.

Complaint - Pain in chest, right shoulder and right arm, shortness of breath.

History - Suddenly 18 months ago while stoking his fires felt a severe pain in right side of chest. Pain continued almost constantly for six months. Kept him awake at nights. After this it got worse and shortness of breath developed. Never hoarseness or dysphagia.

Previous Health &c. - No specific history. Hard work temperate.

On admission - Pains as in history.


J. L.
Dec 26th 1905.
Outline of
Shadow of X rays
2.
3.
4.
2.
3.
4.

Swelling at level of 2nd, 3rd and 4th ribs in aortic region, 2½ ins. to right and 1½ ins. to left of mid sternum.
Tenderness on pressing over this swelling
Slight pulsation over area. No pulsation in supra-sternal notch.
Dulness at level of 2nd rib, 2½ ins. to right and 1¾ ins. to left of mid-sternum.
2nd aortic sound loud and ringing. Systolic murmur over swelling. Heart slightly enlarged.
Pulse regular - tension medium, vessels thickened. Pulses equal and synchronous.
Pupils equal. No tracheal tugging.

X rays. - A well marked dilatation of the first part of the aorta - a marked shadow to the right of sternum. (see tracing)

Cases in Class I, Nos. 1 - 8

In these cases the X ray examination is not required to make a diagnosis. The symptoms and signs of the disease are so marked and so characteristic that the diagnosis is quite easy.

The X rays afford a visual demonstration of the presence of the aneurism and may be utilised for the purpose of recording the size of the aneurism from time to time with a view to watching the effect of treatment upon the condition.

In the foregoing cases the aneurismal shadow was seen to pulsate in 5 out of the 8 cases.

CLASS 2. Cases with a few Symptoms and Signs pointing to Aneurism.

Cases 9 and 10.

Aortic Aneurism and slight Aortic Incompetence.

CASE 9.

J. J. 37. Grocer.

Admitted January 11th. 1904.

Complaint - Shortness of breath on exertion; palpitations.

History - Three months ago after some hard work was seized with shortness of breath and pain in the back. No pain since. No difficulty in swallowing. Palpitations.

Previous Health &c. - No specific disease.

On admission - Pulse regular, tension medium. Vessels thickened. Right pulse smaller than left also behind the left in time.

Right carotid pulse smaller than left.

Dulness in aortic region on percussion for ½ in. on each side of manubrium

sterni. No pulsation. No pulsation in supra-sternal notch. Heart enlarged. Systolic aortic murmur.

A loud ringing aortic 2nd sound attended with a diastolic murmur.

No hoarseness. No paralysis of left vocal cord.

No tracheal tugging.

Pupils equal. No albumen or casts.

X Ray - There is a distinct shadow which pulsates slightly.

Aneurism of the Aorta.

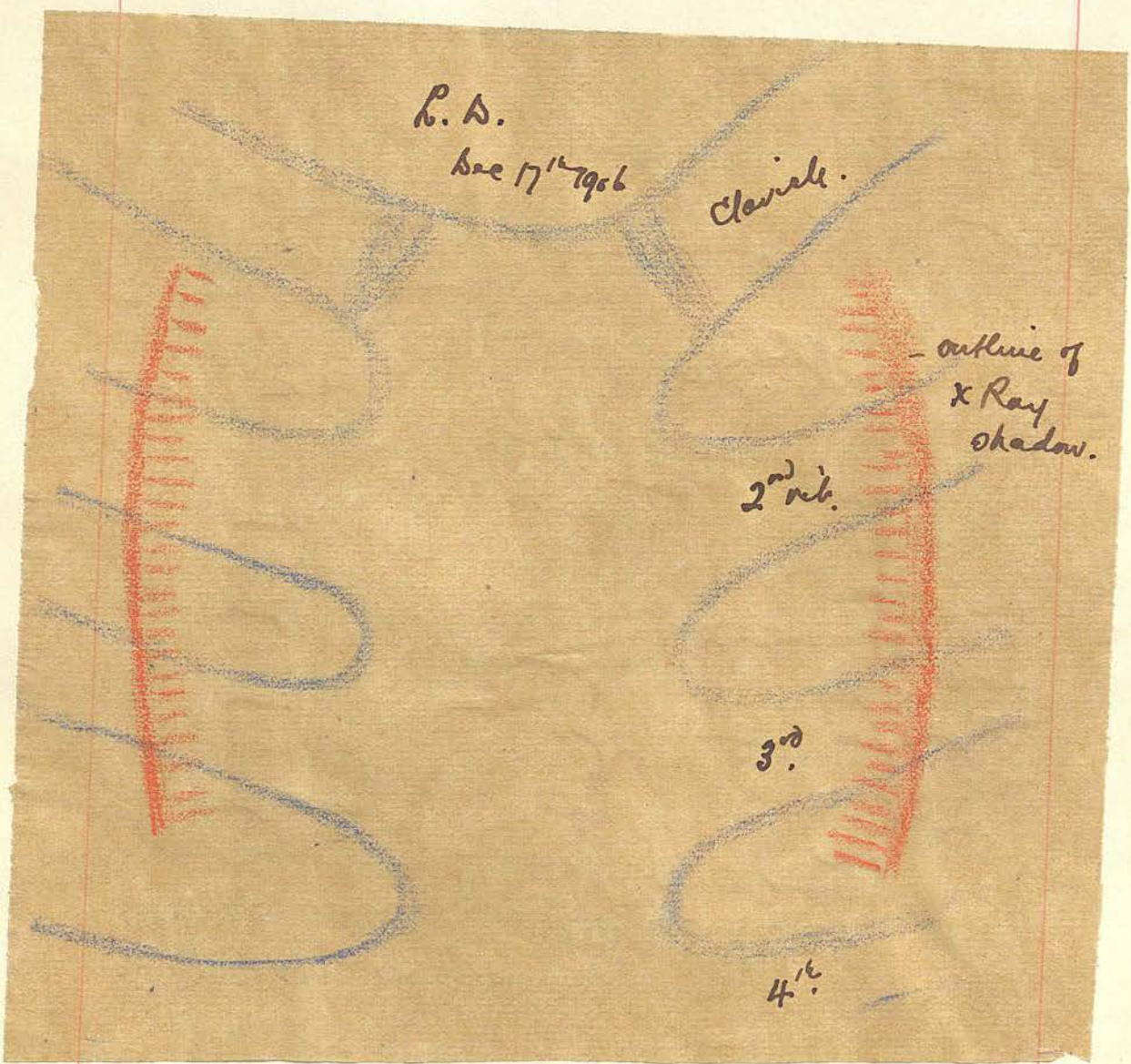
CASE 10.

L. D. 42. Teacher.

Admitted October 10th, 1906.

Complaint - Pain in back and left side and over heart.

History - In August 1904 was troubled with sharp spasm like pains over heart. He had to sit up in bed at nights to breathe. This came on every now and then and kept thus until a year later when after a pretty heavy spell of work he found aching pains right across chest. Ten months later he got a sharp pain in left side which sometimes went to shoulders. Lately has had a gnawing pain in the


R. D.
Dec 17th 1906
Clavicle.
outline of
X Ray
shadow.
2nd rib.
3rd.
4th.

back. Sometimes along with pain his voice gets very hoarse. This disappears when pain goes. No palpitation or giddiness etc.

Previous Health - Denies venereal disease, no miscarriages. Temperate.

On admission - No Oedema.

Pulse irregular, tension good.

Arteries slightly thickened.

Pulses unequal - right is smaller in volume.

Pulses synchronous.

Aortic 2nd sound accentuated.

Systolic murmur in Aortic area and in both carotids.

No pulsation in Aortic region, supra-sternal notch or root of neck.

Dulness on percussion in aortic region 3¼ ins. across.

Some dulness between spinal column and lower angle of left scapula. Over this area a systolic murmur is heard.

No tracheal tugging. No paralysis of left vocal cord.

No dysphagia. Pupils equal.

X Ray - There is a definitely marked pulsating aneurism. (See chart.)

In these two cases the symptoms and signs point to the probable presence of an Aneurism.

A glance at the table given will show that this diagnosis is by no means certain.

The X Ray examination affords abundant evidence to the visual sense, of the presence of an Aneurism. In both cases it is pulsating in character.

CLASS 3. Cases in which few, if any, symptoms and signs of aneurism are present.

Cases 11 - 19.

Aneurism of Ascending Aorta.

CASE 11.

A. G. 39. Railway Guard.

Admitted September 5th 1901.

Complaint - Great difficulty in breathing.

History - Was quite well till 1 year ago, then he was run over by a tramcar and his chest bruised and leg seriously injured. While in bed complained of some pain in the chest, and on getting out of bed he found he was breathless and has remained so ever since. No pain since. Has lost 3 st. in weight. No difficulty

in swallowing and no loss of appetite to account for this.

Previous Health - Denies Venereal disease.

No miscarriages.

On admission - P. had Orthopnoea. There was a loud stridor both with inspiration and expiration. The veins of the head and neck, upper extremities and upper part of the thorax were markedly engorged.

No bulging or visible pulsation anywhere.

Dulness over manubrium sterni and slightly to left of it in 1st and 2nd spaces. No pulsation to be felt over this area.

No pulsation in suprasternal notch.

No tracheal tugging.

Aortic 2nd sound accentuated and sometimes a short diastolic aortic murmur.

Heart normal in size.

Pulse - regular, tension moderate .

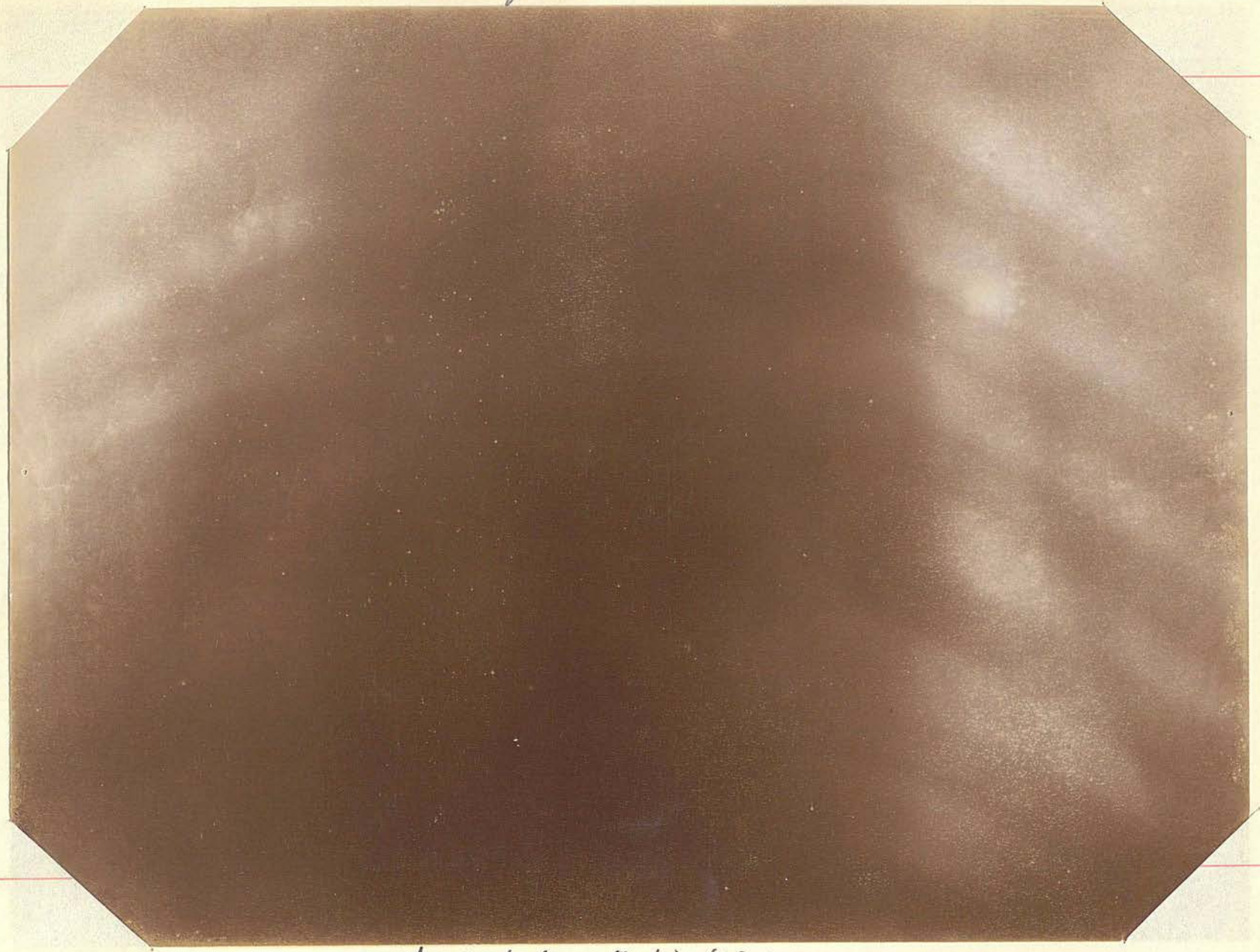
Arteries not thickened. Pulses equal and synchronous.

No albumninuria - no casts.

Pupils equal. No paralysis of left vocal cord.

No enlargement of the glands. No

Shadow gaussmeter.



Radiograph of Gaussmeter.

Heart shadow extending to test.

leucocytosis. No anaemia. No cachexia.

X Ray - A distinct pulsating tumour is seen in the region of the ascending Aorta.

Progress - November 4th 1901.

Under rest in bed, dieting, regulation of the bowels and large dose of Potassium Iodide the patient has improved considerably. Shortness of breath much less marked - no stridor - venous engorgement less - has gained 5 lbs. in weight.

January 31st 1902.

P. was discharged and continued much in statu quo until to-day when he suddenly became very short of breath and spat up about half a pint of bright red blood. Died in a few minutes.

Post Mortem - An Aneurism about the size of an orange involving the ascending and transverse parts of the Aortic arch. It compresses the superior vena cava and the bronchi just below the bifurcation of the trachea.

There is a small opening between the aneurism and the right bronchus.

The heart is normal and valves healthy.

No evidence of arterial disease.

Kidneys quite healthy.

Remarks - The differential diagnosis in this case was very difficult and the X ray screen showing a pulsating shadow was of very material benefit in making a diagnosis.

Points chiefly in favour of new growth:-

1. Great loss of weight.
2. Absence of pain.
3. No visible or palpable pulsation in Aortic region or suprasternal notch.
4. No tracheal tugging.
5. Pulses equal and synchronous.

Points chiefly in favour of Aneurism :-

1. Accentuation of Aortic 2nd sound and occasionally a short diastolic murmur (~~due probably to~~
2. No glandular enlargement.
3. No anaemia or leucocytosis.
4. No cachexia.
5. X ray examination - a pulsating tumour.
6. Marked improvement in his general condition under treatment.

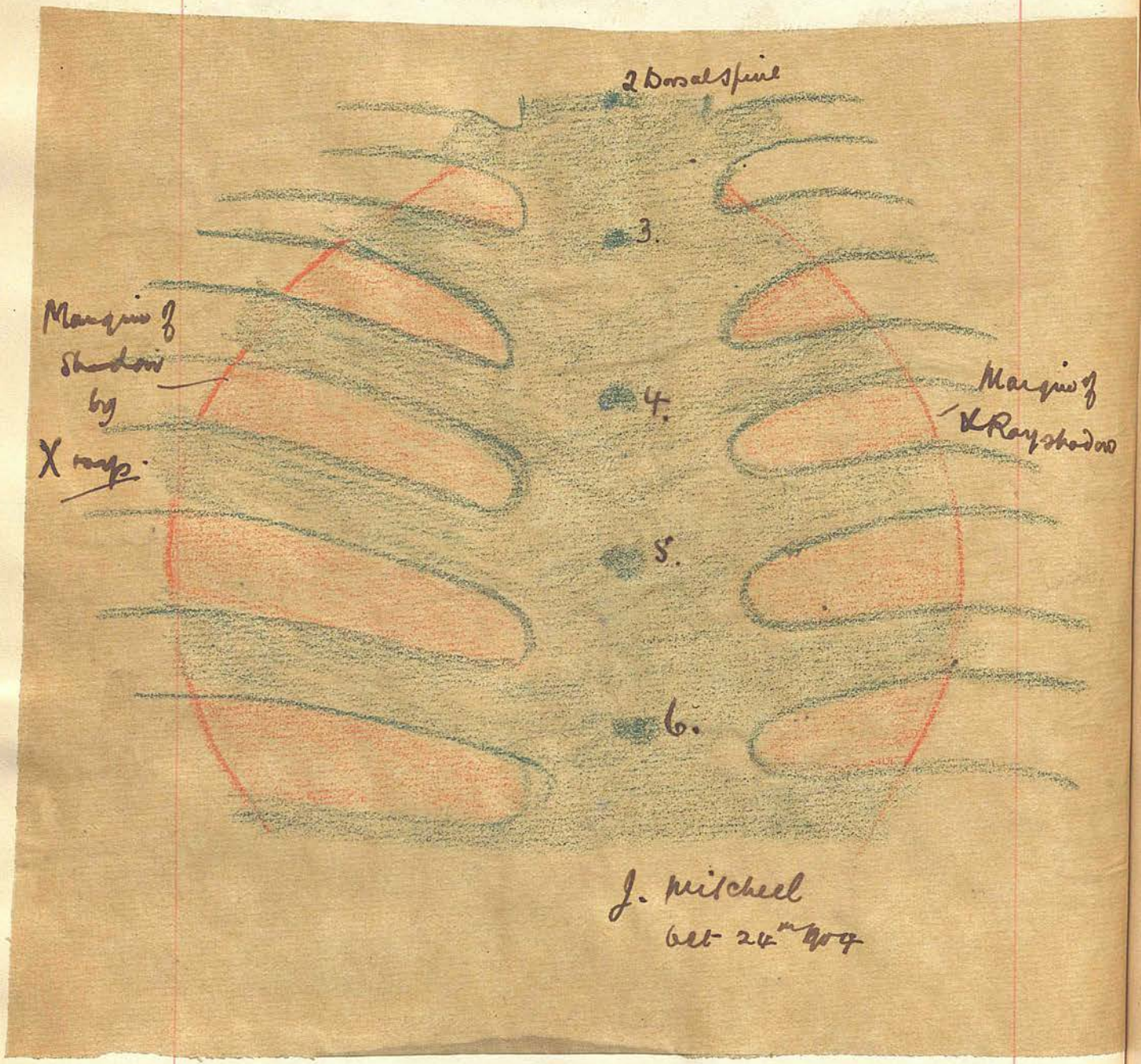
Aneurism of the Aorta.

CASE 12.

J. M. 53. Cabman.

Admitted October 13th 1904.

Complaint - Heated sensation in chest passing down the left arm and sometimes the right arm.


2 Dorsal spine
3.
4.
5.
6.
Margin of shadow by X ray.
Margin of X Ray shadow
J. Mitchell
Oct 24th 1904

History - Four years ago became short of breath on exertion. 10 months ago this got worse and he began to feel a hot sensation over his chest in front. 5 or 6 months ago this began to pass down left arm.

Has had slight attacks of dropsy in his legs.

Previous Health &c. - No specific history. Temperate.

On admission - Pulse - regular, low tension - walls not thickened. Pulses equal and synchronous.

Some impairment of the note over manubrium sterni and slightly to the right and left of it in 1st interspace.

No pulsation.

Heart enlarged.

Systolic and diastolic aortic murmur.

No other symptoms or signs.

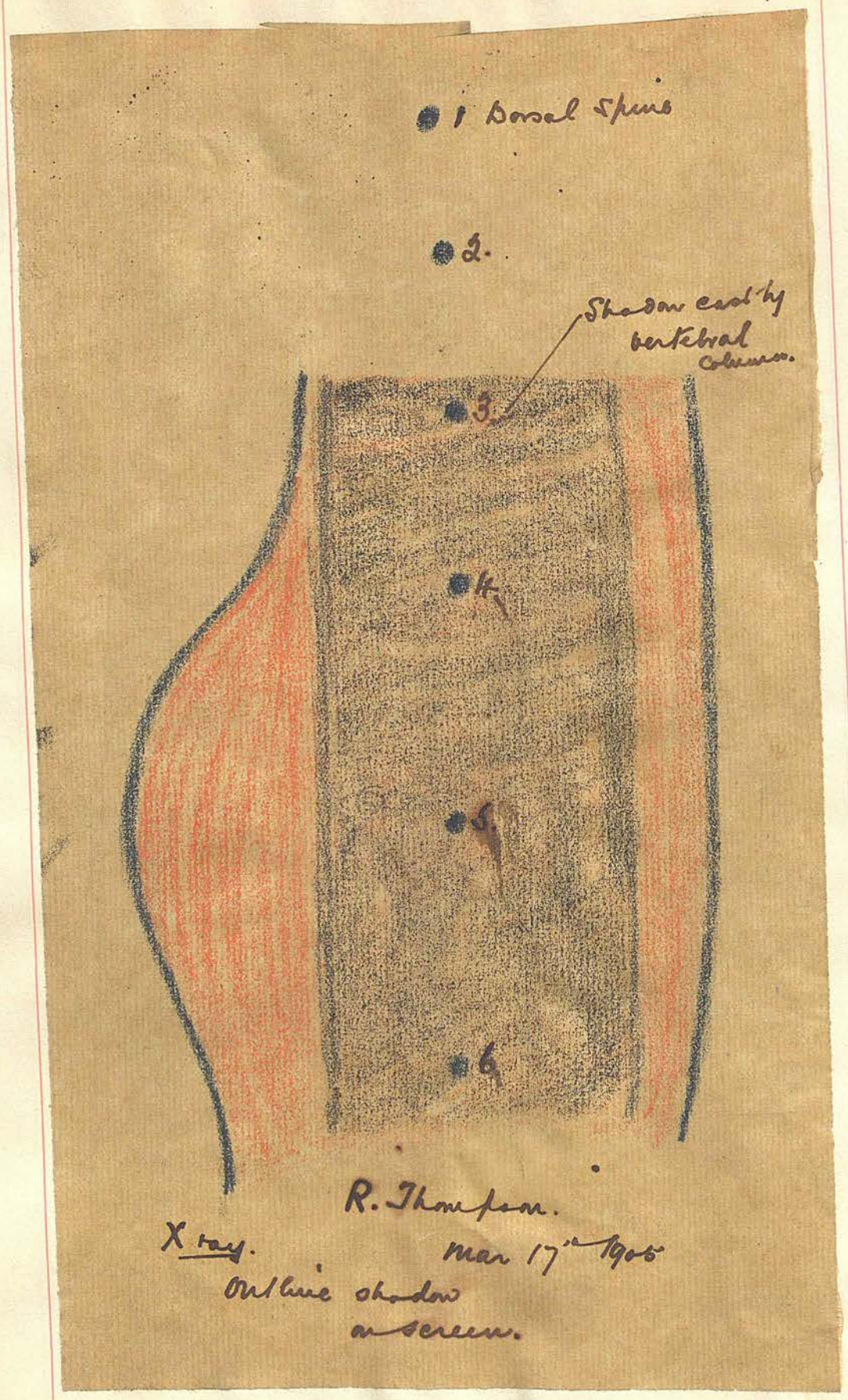
X Ray - An abnormal shadow can be seen, the outline of which has been mapped out.

Aneurism of Descending Aorta.

CASE 13.

R. T. 52. Railway Guard.

Admitted June 24th 1905.



R. Thompson.

X ray. Mar 17th 1905

Outline shadow on screen.

Complaint - Pain under both shoulder blades and in the spine on exertion.

History - A year ago he became troubled with pain in the left side of the chest on exertion. This got worse and then affected the shoulder blades. The pain shoots across the chest and down the outside of both arms.

Has lost about 3 stone in weight.

Previous Health &c. - No specific history.

Temperate.

On admission - Pulse, regular, tension good.

Walls thickened. Pulses equal and synchronous.

No pulsation, no dulness either front or back. All heart sounds are weak. No accentuated aortic 2nd sound.

Heart not enlarged.

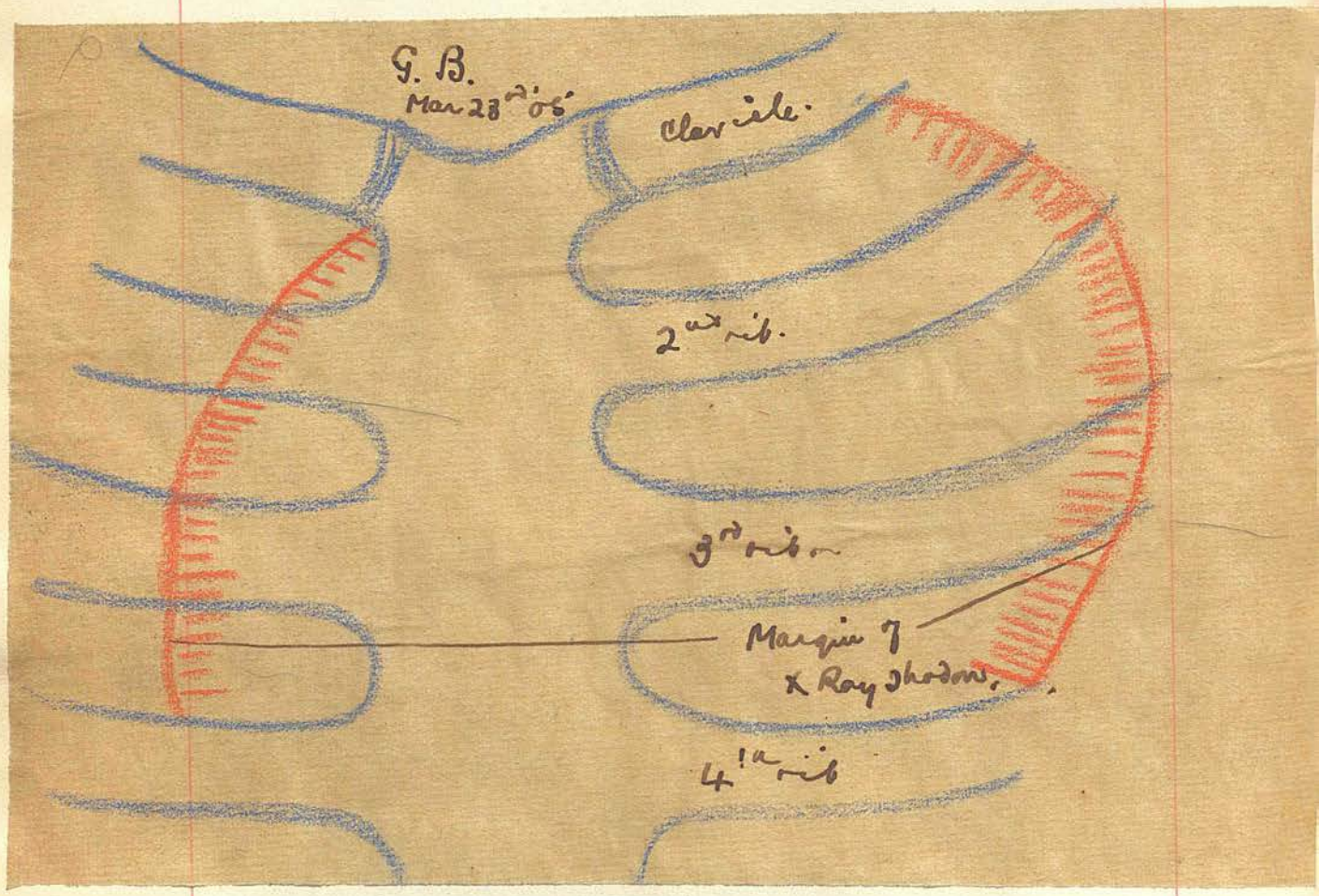
No albuminuria.

No tracheal tugging.

No dysphagia. No hoarseness.

Pupils equal. Has improved under treatment.

X Ray - There is a distinct shadow to be seen especially posteriorly.


G. B.
Mar 28nd '05.
Clavicle.
2nd rib.
3rd rib.
Margin of
X Ray Shadow.
4th rib

Aneurism of Aorta.

CASE 14.

G.B. 39. Labourer.

Admitted March 18th, 1905.

Complaint - Pain across the chest and going into the back.

History - A year ago he had a slight pain in chest similar to that now present - it went away very shortly.

5 weeks ago pain returned suddenly and very severe. A continuous pain, increased on exertion. It passes round to the back and is worse when he lies down. No dysphagia.

Previous Health &c. - No specific history.

Was 16 years in the Army, and then drank heavily.

On admission - Pulse regular, tension moderate.

Pulses equal and synchronous.

The manubrium sterni is slightly prominent and also some prominence to the left of it in the 1st interspace.

Pulsation can be felt in this area.

Dulness on percussion, 1¼ ins. to right and 2¼ ins. to left of midsternum at level of 2nd rib. A systolic aortic murmur. Aortic 2nd sound accentuated.

No tracheal tugging. No hoarseness.


1 Dorsal spine
2
7
8
M.B.
Outline of
X ray shadow.
from the back.
Nov 14th 1905.

No paralysis of vocal cord. No dysphagia. Pupils equal.

X Ray - There is a large, slightly pulsating, shadow as marked out.

Aneurism of the Aorta.

CASE 15.

M. B. 33. Carter.

Admitted November 11th, 1905.

Complaint - Pain in the chest.

History - Four years ago first felt pain in the chest, a heavy sort of feeling. Does not shoot down arm. Never hoarseness or difficulty in swallowing. Occasionally pain between shoulders.

Previous Health &c. - No specific history. Work not hard. Temperate habits.

On admission - Pain over sternum working upwards to root of neck. No shortness of breath or cough. Pulse regular, tension moderate. Vessels not thickened. Pulses equal and synchronous. Marked pulsation in suprasternal notch. No dulness in aortic region and no pulsation. Heart normal in size.

2nd Aortic sound slightly accentuated.

No tracheal tugging. Pupils equal.

No albuminuria or casts.

X Rays - There is a definite aneurismal enlargement of the first part of the arch of the Aorta.

Aneurism of the Arch of Aorta.

CASE 16.

J.S. 70. Marble cutter.

Admitted, February, 5th, 1906.

Complaint - Hoarseness in throat and partial loss of voice.

History - Was quite well till about a year ago when he became troubled with a very persistent tickling feeling in the throat. This got worse and made him cough, and he often spat up sputum streaked with blood.

Two or three months later his voice began to get weak and hoarse. This has gradually got worse. Never any pain in chest.

Previous health - Denies syphilis. Temperate.

On admission - No pain or discomfort.

Pulse regular, tension moderate. Arteries slightly thickened.

No difference in pulses.

Pulsation in suprasternal notch.

Dulness in aortic region extending 2¾ ins. to right and 2½ ins. to left of mid-

J.M. April 14th 1906.

Shadow of Aneurism.

Radiograph of Aneurism.

sternum. No pulsation to be seen or felt. No murmurs. Aortic 2nd sound not accentuated. No difficulty in swallowing. No tracheal tugging. Pupils equal. Left vocal cord fixed.

X Ray - There is a distinct, slightly pulsatile shadow in region of transverse Aorta.

Aneurism of the Descending Aorta.

CASE 17.

T.M. 55. Blacksmith.

Admitted March 31st, 1906.

Complaint - Pains in back and left side.

History - About 18 months ago pain started in the right side of the chest. It worked round the front of the chest and settled in the small of the back on the left side. Pain was so severe that he had to sit up to get relief.

About a year ago pain became more aching in character and has remained as such since.

A week ago a smarting pain, worse at nights, developed in left side of chest. Worse about level of nipple.

Previous Health - Denies venereal disease.

Temperate habits.

On admission - No further symptoms.
Pulse regular, tension rather high.
Arteries thickened.
Radial pulses equal and synchronous.
Heart not enlarged. No murmurs.
Aortic 2nd sound accentuated. No albuminuria. No casts. Pupils equal, no other signs.

X Ray - There is a dilatation of the descending thoracic Aorta.

Aneurism of the Aortic Arch.

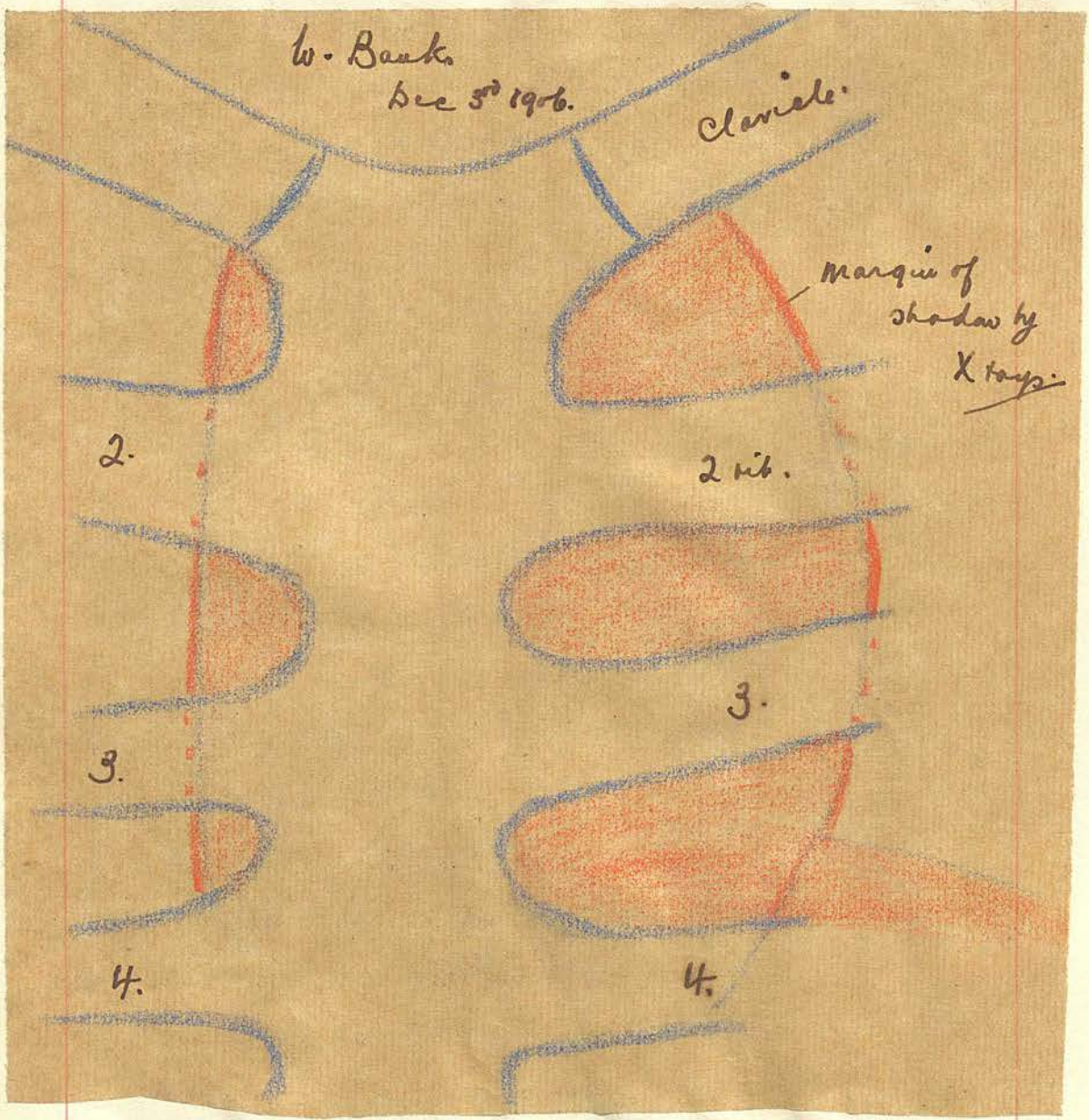
CASE 18.

W.B. 51. Fisherman.
Admitted November 29th, 1906.

Complaint - Shortness of breath. Pain in left side. Choking feeling in throat.

History - About 3 years ago first troubled with shortness of breath and a choking sensation in his throat. These continued off and on, worse at times. A month ago they came on worse, and a dull pain in the left side started.
Never hoarseness or difficulty in swallowing. Has got much thinner during the last 2 years.

Previous Health &c. - No specific history.
Hard work. Temperate.


W. Bauk.
Dec 5th 1906.
Clavicle.
Margin of shadow by X rays.
2.
2 wk.
3.
3.
4.
4.

On admission - Pulse - regular, tension moderate. Arteries thickened. Pulses equal and synchronous.

Heart not enlarged. No pulsation. Slight impairment of percussion note to left of sternum. Aortic 2nd sound slightly accentuated.

No tracheal tugging. No involvement of larnyx. Pupils equal.

X Ray - There is a pulsating shadow in the region of the Aortic arch as mapped out.

Aneurism of the Aorta.

CASE 19.

J.T. 49. Mason.

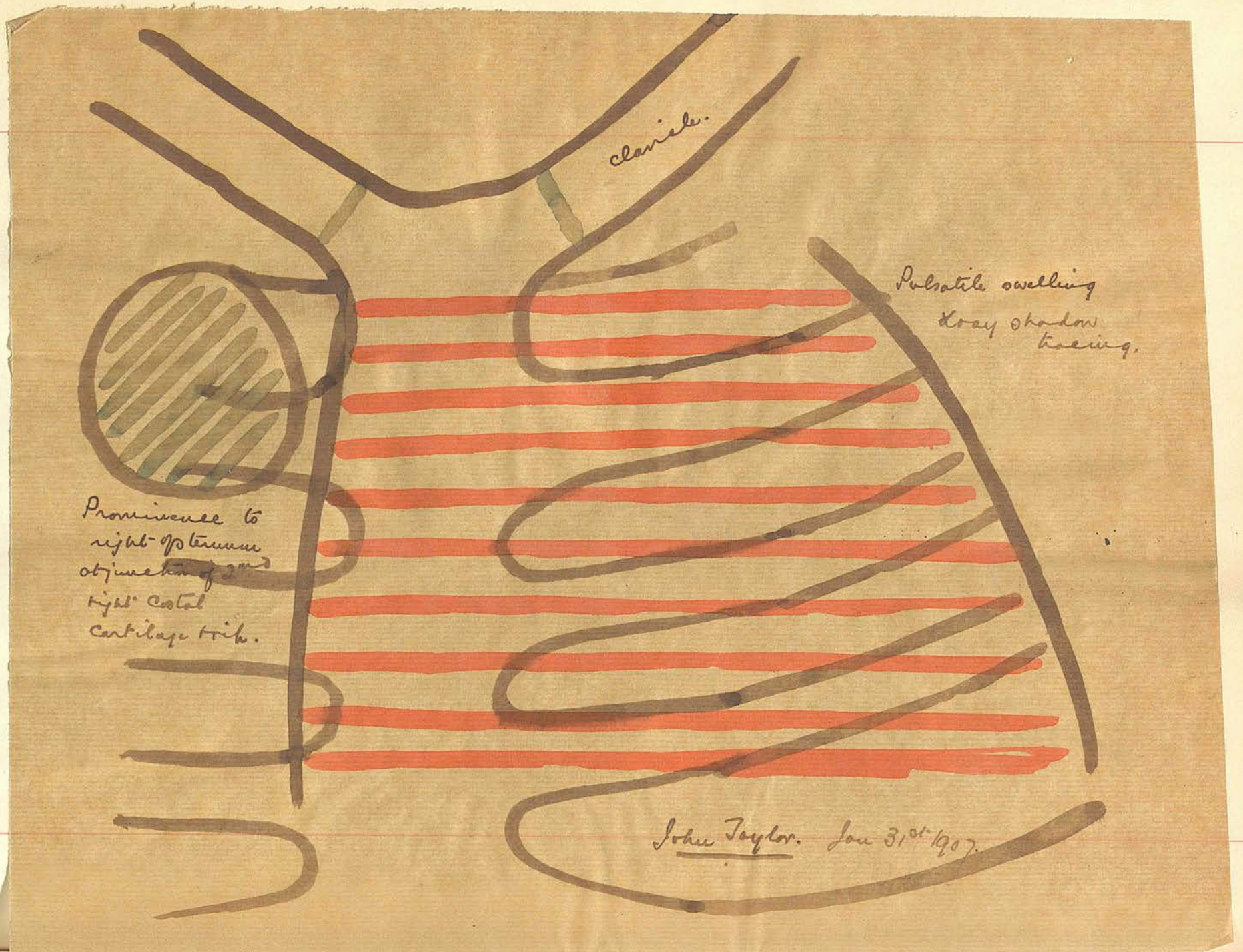
Admitted January 28th, 1907.

History - Three or four weeks ago P. got a blow on chest from a plank. The area struck was very painful for some time afterwards. A swelling about size of marble was afterwards found at juncture of 2nd right costal cartilage with rib. No pain in it. This swelling has increased in size.

Previous Health - Never Rheumatic fever. Denies Syphilis.

On admission - No symptoms - no pain.

Pulse regular, tension moderate. Arteries


clavicle.
Pulsatile swelling
X-ray shadow
tracing.
Prominence to
right of sternum
obliterating 2nd
right Costal
Cartilage & rib.
John Taylor. Jan 31st 1907.

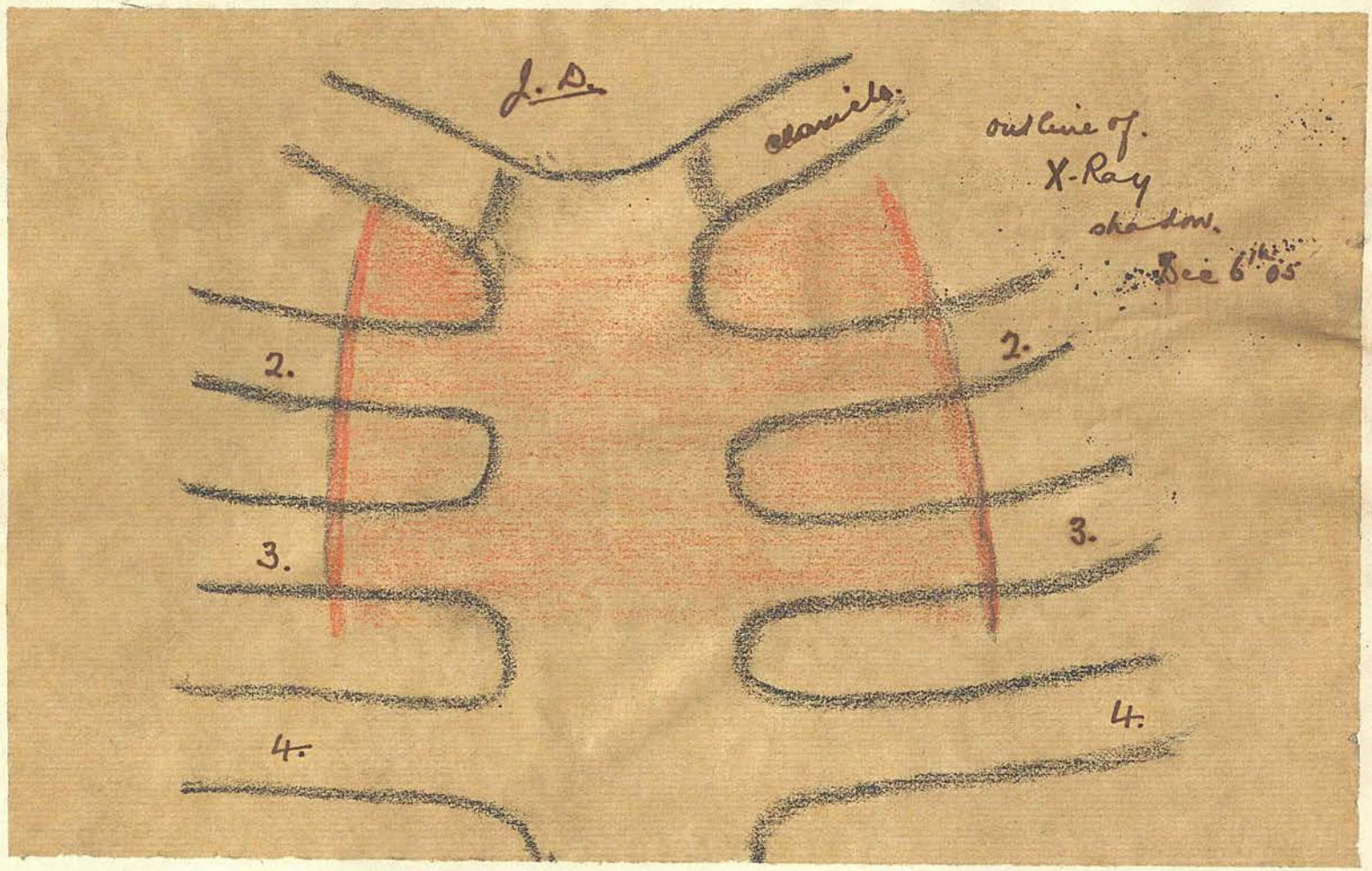
thickened. Pulses equal.
Aortic 2nd sound slightly accentuated.
No dulness on percussion in Aortic region.
No pulsation in Aortic regions.
No tracheal tugging. No difficulty in swallowing.
Pupils equal.
No enlarged glands. No anaemia..
Differential Count, Polymorphs 62%
Lymphocytes 36%. Eosinophiles 2%.

X ray. - There is a definite slightly pulsatile swelling to be made out, this swelling has been carefully mapped out, and so far as can be ascertained by screen examination a diagnosis of aneurism seems the most probable.

Class 3.

Cases 11 - 19.

Here we have the usefulness of the examination by means of the X rays reaching its highest point. The diagnosis is extremely uncertain and in some cases was not even suspected until on X ray examination a definitely pulsating shadow was observed. In four of the cases there was no dulness on percussion in the aortic region. The symptoms and signs are very few and such as might quite easily be explained on other grounds, but the positive


L. D.
clavicle
outline of
X-Ray
shadow.
Dec 6th 05
2.
3.
4.
2.
3.
4.

evidence of the screen and radiographic examinations affords ample proof of the presence of an Aneurism to account for the symptoms.

In five of these cases the shadow pulsated, in four cases it was not observed to pulsate.

CLASS 4.

CASES OF DILATATION OF THE AORTA.

Cases 20 - 24.

CASE 20.

Dilatation of the Aorta.

J.D. 33. Labourer.
Admitted December 3rd, 1905

Complaint - Cough, shortness of breath, feeling of oppression in chest.

History - After a drinking bout 6 weeks ago cough and shortness of breath started and also a feeling of weight in the chest - relieved by sitting up.

Previous Health &c. - Specific disease 5 years ago. Rheumatic fever 3 years ago. Patient very alcoholic. No very hard strains.

On admission - Pulse regular - tension low, arteries thickened, pulses equal and synchronous.
Pulsation in supra-sternal notch.
No pulsation in aortic region.
Dulness to left of sternum ½ in.
Systolic and diastolic aortic murmurs.
No fulness of veins in neck. No pain in chest. No tracheal tugging.
No hoarseness. No alteration in voice. No difficulty in swallowing.
No stridor. Pupils equal. No wasting.

X Rays. - There is a broadening of the aorta as is indicated by skin pencil markings. (See chart).

CASE 21.

Dilatation of the Thoracic Aorta.

Mrs. S. 40. Dressmaker.
Admitted February 27th 1906.

Complaint - Shortness of breath. Pain in left side.

History - For the last four years has complained of breathlessness and pain of an intermittent character in the left side for three years.

Previous Health. - Rheumatism 14 years and 7

Mrs S. March 4th 1906.

Radiograph of dilated aorta.

years ago. No syphilitic history.

On admission - No further symptoms.

Pulse regular, tension moderate, arteries not thickened.

Right pulse rather less in volume than left pulse, they are synchronous.

Pulsation in supra-sternal notch.

No pulsation in aortic region to be seen.

In 2nd and 3rd spaces to left of sternum slight pulsation can be felt

On percussion some impairment of note over manubrium and slightly to left of it.

A distinct aortic systolic murmur.

Aortic 2nd sound sharply accentuated

Heart not enlarged. No albuminuria or casts. No tracheal tugging.

Pupils are not affected.

No difficulty in swallowing.

Sometimes patient has a gripping sensation in her throat. No hoarseness. Vocal cords not affected.

X Ray. - There is a distinct dilatation of the aorta.

CASE 22.

Dilatation of the Aorta.

A.McG. 55. Vulcanite worker.

Admitted August 21st, 1906

Complaint - Pain across the chest.

History - A gripping pain felt in middle of chest - commenced four years ago. Sometimes he was free of pain for months. Starts in middle of chest and goes right through to the back. A little short of breath during attack of pain. Pain shoots down both arms to wrists.

Previous Health - Never Rheumatic fever. Denies venereal disease. Smokes 3½ oz. per week, Not a heavy drinker.

On admission - Symptoms as above. Pulse - tension moderate, vessels thickened, left radial fuller and stronger than right. Dulness in aortic region 3¾ ins. level 2nd rib. Aortic 2nd sound markedly accentuated. No pulsation in supra-sternal notch. No tracheal tugging. No hoarseness. No difficulty in swallowing. Pupils equal.

X rays. - There is a distinct uniform dilatation of transverse aorta.

No pulsation seen in screen examination.

Dilated Aorta.

CASE 23.

G.K. 48. Tailor.

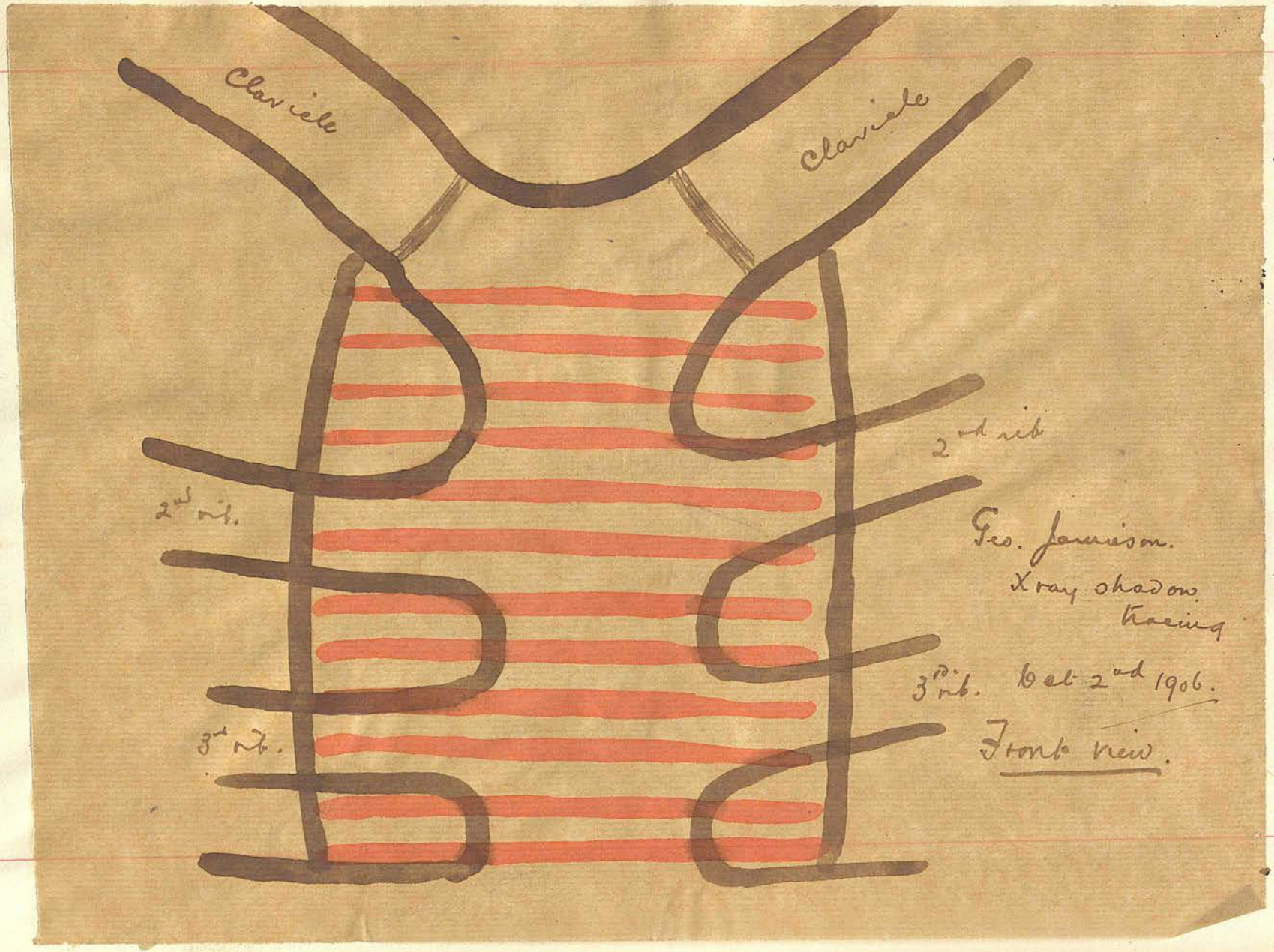
Admitted September 8th, 1906.

Complaint - Pain over heart from front to back. Shortness of breath, giddiness, etc.

History - Troubled with pain and shortness of breath for 3 years. No previous strain before before it developed, a gradual onset. A month ago pain shot into left shoulder up into neck and down left arm. No cough or spitting of blood.

Previous Health - Rheumatic fever 20 years ago. Denies venereal disease. Temperate habits.

On admission - Symptoms as under history. Pulse irregular, tension low, water-hammer pulse - arteries thickened - pulses equal and synchronous. Systolic and Diastolic Aortic murmurs. Dulness in aortic region 3½ ins. across at level of 2nd rib, chiefly to left of sternum. No pulsation. No pulsation in suprasternal notch.


Clavicle
Clavicle
2nd rib
2nd rib.
3rd rib.
3rd rib.
Geo. Jamieson.
X ray shadow
tracing
3rd rib. Oct 2nd 1906.
Front view.

No tracheal tugging. No hoarseness.
No difficulty in swallowing. Pupils equal.

X Ray - There is a distinct dilatation of Aorta as marked on skin.
No pulsation seen in shadow.

Dilatation of the Aorta.

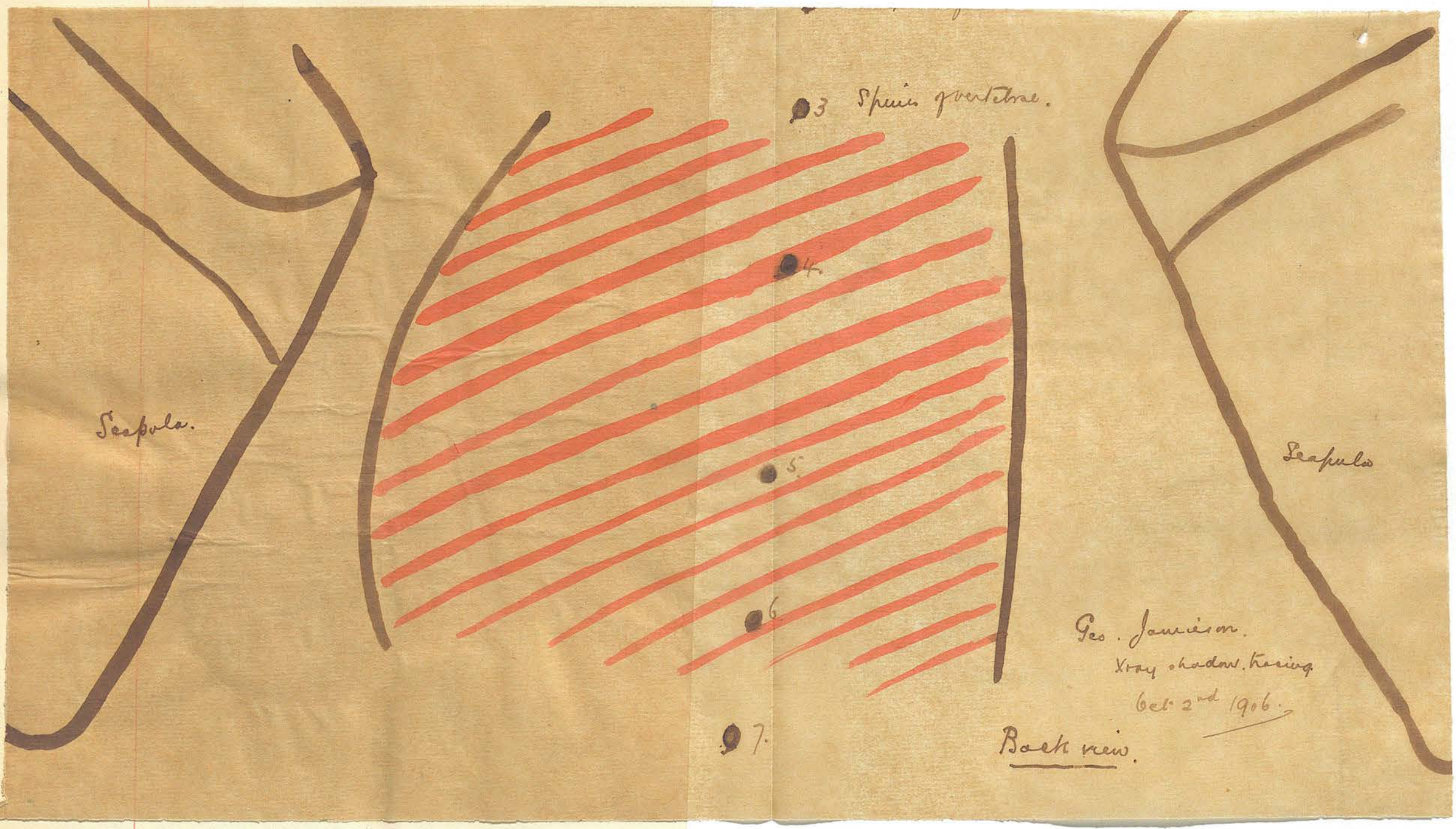
CASE 24.

G.J. 43. Carter.
Admitted October 1st, 1906.
Came in for some stomach trouble.

On admission - Nothing in history pointing to affection of chest.

Previous Health - Never Rheumatic fever. Denies venereal disease. Hard exposed work. Temperate habits.

On admission - No symptoms.
Pulse regular, tension moderate.
Arteries thickened. Pulses equal and synchronous.
Systolic aortic murmur.
Aortic 2nd sound accentuated.
No dulness in aortic area.
No pulsation in aortic area.
Pulsation in suprasternal notch. Pupils equal. No tracheal tugging.


3 Spin. process.
4.
Scapula.
5.
6
7.
Scapula
Geo. Jamieson.
X ray shadow. tracing
Oct. 2nd 1906.
Back view.

X Ray - There is a dilatation of the Aorta measuring 4 ins. across, affecting ascending and transverse Aorta.
No pulsation seen in shadow.

Class 4.

Cases 20 - 24.

In these cases the symptoms and signs are few.

The X rays gives evidence of a dilatation of the Aorta.

In all five cases there was no pulsation observed.

CLASS 5. Cases of Mediastinal New Growth.

Malignant New Growth.

CASE 25.

57. Cellarman.

Admitted January, 28th, 1902.

Complaint - Great shortness of breath on exertion, debility, hoarseness of voice, cough and pain in left side of chest.

History - Seven months ago illness commenced gradually with a cough - very little sputum - no blood in sputum. Has lost 1½ stones in weight. Some sweating at nights. Other symptoms as under

complaint came on about the same time.

Previous health &c. - Specific disease 20 years ago. Alcoholic.

On admission - Patient is thin and weak. No cachexia. Temperature normal. Voice is hoarse and high pitched. Cough is hard and ringing. Paralysis of left vocal cord. No dysphagia. Marked dulness on percussion over the whole of the left lung, except over the extreme base where there is a slightly resonant note on forcible percussion. Marked tubular breathing over the whole of the left lung, more marked at the apex. Measurement of chest at level of nipple, right side 18¼ ins., left side 18¾ ins. Heart not displaced. Pulse regular, tension moderate. Arteries thickened. Left pulse smaller. Pulsation felt in 2nd and 3rd left interspaces.

Well marked systolic murmur, audible over this area and also in aortic area and in the back down the right side of the spinal column.

Accentuation of 2nd sound at the base of heart (? Aortic.)

Veins of head and neck and arms especi-

ally on the left side are engorged.

No tracheal tugging.

Pupils - left is often smaller than the right. Left 2 m.m., right 3 m.m.

No anaemia.

There is a marked leucocytosis 28,000 per c. mm.

No enlargement of glands in neck or axilla.

X Ray - The picture obtained both on the screen and on the photographic negative was very indistinct. It showed complete consolidation of the left lung and some opacity to the right of the spinal column, between the right scapula and the middle line. No opinion could be given from this examination as to the presence or absence of an aneurism.

This is a very difficult case and the diagnosis very obscure. The X rays throws no light whatever upon the diagnosis.

Patient improved for about 5 weeks and then suddenly took an attack of difficulty in breathing and died shortly afterwards.

Post Mortem.- A large new growth involving the bronchial glands and the root of the left lung extending along into the lung tissue. The left bronchus is completely occluded. The transverse part of the arch of the Aorta and the commencement of the descending aorta are embedded in and completely surrounded by the new growth. No disease of the Aorta and no heart disease.

New Growth in Mediastinum.

CASE 26.

J.M. 25. Printer's machinist.

Admitted September 7th, 1906.

Complaint - Swelling of face and neck. Shortness of breath, pain in chest, difficulty in swallowing.

History - Three months ago began to complain of pain in chest and shortness of breath. Soon after this he spat up a small quantity of blood.

Three weeks ago face and neck began to swell. Since swelling commenced the shortness of breath has got worse, his eyesight has become dimmer. He has had several nose-bleedings, and difficulty

in swallowing, first of solids, later of fluids has developed.

Previous health - Denies Syphilis. Temperate habits. Not laborious work.

On admission - Face and neck markedly swollen and deeply cyanosed. Numerous small distended veins present on the front and back of the thorax. The veins of the arms were also engorged and the large veins running down the front of the abdomen were unduly prominent.

No enlarged glands could be felt above the clavicles or in the neck, but the oedema here was very marked.

Marked dulness over upper part of sternum and for 1 inch on each side of it. No pulsation could be felt. No abnormal sounds over area of dulness.

No murmur. No accentuated Aortic 2nd sound.

No pulsation in suprasternal notch.

No tracheal tugging.

Radial pulses equal and synchronous.

Voice husky but no laryngeal paralysis.

Difficulty in swallowing varied considerably from day to day.

There was dulness over base of right lung and numerous rales and rhonchi were heard

J.M. Sept 14th 1906.

Radiograph of Mediastinal New Growth.

over both lungs.

Scanty sputum showing nothing characteristic on microscopic examination as abnormal cells.

The lower limbs and buttocks were markedly emaciated.

Pupils were equal.

There was a leucocytosis of 16,800.

Differential Count - Polymorphs 85%, Lymphocytes 12%, Large Mononuclear, 1%, Eosinophiles 1%, Basophiles 1%.

X Ray - There is a well defined pulsating shadow in the position of the Aortic arch. This pulsation was markedly expansile.

Diagnosis - The diagnosis arrived at, notwithstanding the evidence of an expansile pulsating tumour by X ray examination, was one of solid intra-thoracic growth. This diagnosis was based on the following grounds:-

1. Patient only 25 years of age.
2. Temperate habits - not alcoholic.
   No history of syphilis - no laborious work.
3. Marked emaciation of legs and buttocks.
4. Marked leucocytosis 16,800.

5. Absence of pulsation over dull area and in suprasternal notch.
6. Absence of tracheal tugging.
7. Absence of accentuated 2nd aortic sound.
8. Marked cyanosis and swelling of head and neck.

The points more particularly in favour of Aneurism were -

1. The thoracic and back pains which is a symptom far commoner in aneurisms than tumours.
2. The result of X ray examination - a localised with well marked expansile pulsation in the exact position of the aortic arch.

Progress - September 19.

Left pulse less full than right. Pupils equal. Dulness over the whole of the right lung very marked at base where breath soundsand vocal resonance are diminished.

October 13.

Whole of right lung is now solid. Marked tubular breathing increased vocal resonance and marked whispering pectoriloquy.

October 28th.

Pupils - left 3½ m.m., right 2½ m.m.

November 9th.

Pupils - left 5½ m.m., right 3½ m.m.

November 13th.

Marked oedema of right arm.

Less oedema of left arm.

Cyanosis more marked, also dysphagia.

Thoracic and abdominal veins distended more than before.

P. died to-day.

Post Mortem - A large mass of soft new growth was situated in front of and around the ascending thoracic aorta and the aortic arch.

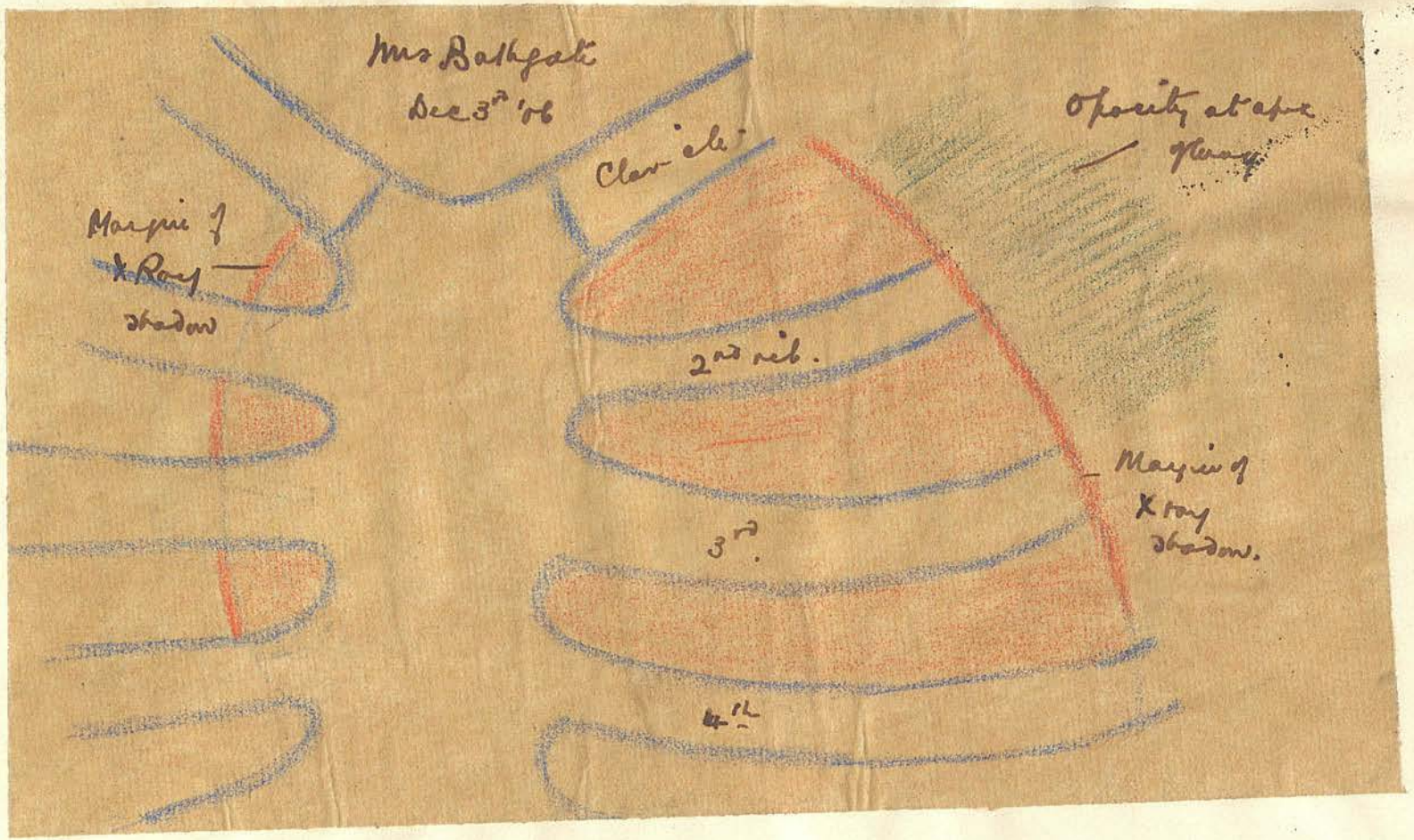
A mass of new growth extended along right bronchus and infiltrated the right lung which was solidified throughout its whole extent.

The oesophagus was pushed aside and its canal pressed upon by a large mass of new growth in the posterior mediastinum.

The superior vena cava was filled with a firm adherent thrombus.

Numerous small secondary nodules of new growth were present in the liver, omentum, suprarenal capsules and kidneys.

On microscopic examination the tumour was shown to be a round celled sarcoma.


Mrs Baldgate
Dec 3rd '06
Clavicle
Opacity above
Margin of
X Ray
shadow
2nd rib.
Margin of
X ray
shadow.
3rd.
4th

Remarks - For our point of view the main feature in this case is the result of the X ray examination.

A definite pulsating shadow was observed on X ray examination.

On X ray examination alone the case would certainly have been diagnosed as an aneurism.

The presence of the pulsating character of the shadow may be explained by the presence of the soft sarcomatous tumour tissue surrounding the aorta, receiving the impulse from it and expanding as the result of that impulse.

CASE 27.

Mrs B. 58. Housekeeper.

Admitted November 16th, 1906.

Complaint - Cough, shortness of breath, giddiness and swelling of the legs.

History - About 4 months ago began to have a cough and shortness of breath on exertion.

Never spat up much - never spat blood.

Two weeks ago legs began to swell.

No pain or palpitation. Has had giddiness for years.

Much thinner since illness started.

Never troubled with speech or swallowing.

Previous Health &c. - No specific history.

Temperate. Looks as if she has had a hard life.

On admission - Symptoms as in history.

Pulse irregular, tension low, arteries thickened. Right pulse fuller and stronger than left pulse. Pulses are synchronous.

Heart somewhat enlarged.

A loud systolic aortic murmur. Aortic 2nd sound accentuated.

Some dulness for 1½ ins. to right of midsternum.

Pulsation in suprasternal notch, and also to the right of the dull area in 2nd 3rd and 4th spaces on expiration. No dulness over this area.

No tracheal tugging. No dysphagia.

Pupils equal. Larynx not affected.

Left side of chest in front is very flat and does not move at all. Right side moves very slightly on respiration. No sputum. Marked dulness over the whole of right and left lung in front and behind.

Bronchial breathing over apex of left lung and a few moist sounds. Vocal resonance is increased over the whole of

left lung and whispering pectoriloquy present.

There is a little fluid in abdomen.

A trace of albumen in urine. No casts.

Slight anaemia - Whites = 9,000 per c.mm.

While in hospital patient vomited some dark half digested blood twice.

X rays - There is a pulsating tumour which cannot be differentiated from an opaque mass in the left lung.

Progress - Patient gradually got weaker and died.

Post Mortem - There was no arterial disease.

There was a mass of new growth in the neighbourhood of the aortic arch extending chiefly into the right lung.

Also a few nodules in the left lung.

The upper lobe of left lung was collapsed and much broken down.

In these last three cases the differential diagnosis between Aneurism and mediastinal new growth arose.

This was extremely difficult, many points being in favour of one and many in favour of the other. The X ray examination did not throw much light on the subject. In the first case an indistinct shadow was obtained. There was no pulsation in it.

In fact the X ray examination threw no light on the diagnosis.

In the second case a distinct pulsating tumour was seen. The pulsation was expansile. The evidence of X ray examination pointed to the presence of an aneurism and such was the diagnosis which was sent from the Electrical Department. On post mortem examination, however, a large mediastinal tumour was discovered completely surrounding the Aorta which was not diseased at all. Evidently in this case the soft tumour mass surrounding the artery had expanded with it at each pulsation and so given rise to the expansile pulsation which was observed on screen examination.

In the third case also there is a pulsating tumour. This cannot be differentiated from an opaque mass in the left lung.

At the X ray department a diagnosis of Aneurism was made.

On post mortem examination however, there was no arterial disease but a malignant new growth infiltrating the lung.

In Case 11, many of the symptoms and signs pointed to the presence of a new growth in the thorax.

There were others in favour of an Aneurism chiefly the pulsating character of the X ray shadow.

Post mortem examination revealed an aneurism

of the ascending Aorta.

These cases go to show that the mere presence of pulsation in the shadow is insufficient evidence on which to base your diagnosis of aneurism.

Two of the malignant cases showed a pulsating shadow. In one of them certainly it was expansile.

From the results of these four cases we may be led conclude that the X ray examination does not throw ~~any~~ much conclusive light on the differential diagnosis between mediastinal new growths and aneurisms.

In one case the diagnosis was right; in two cases it was wrong; and in the fourth case no definite diagnosis could be made.

Some Aneurisms do not pulsate because of clotting in the sac or for any other reason. Some mediastinal new growths pulsate. This renders the differential diagnosis more than ever difficult.

	A.								B.		C.									D.					E.		
	Case 1.	" 2.	" 3.	" 4.	" 5,	" 6.	" 7.	" 8.	Case 9.	" 10.	Case 11.	" 12.	" 13.	" 14	" 15.	" 16.	" 17.	" 18.	" 19.	Case 20.	" 21.	" 22	" 23.	" 24.	Case 25.	" 26.	" 27.
1. Tumour	x			x				x																			
2. Dulness on percussion	x	x	x	x	x	x	x	x	x	x	x	x		x		x		x		x	x	x	x			x	x
3. Expansile pulsation in Aortic area	x					x	x																				
4. Pulsation in supra-sternal notch			x		x	x									x	x				x	x			x			x
5. Systolic murmur in Aortic area	x	x	x		x	x	x	x	x	x		x		x						x	x		x	x	x		x
6. Accentuated 2nd Aortic sound	x	x	x	x	x		x	x	x	x	x			x	x		x	x	x		x	x		x	x		x
7. Unequal pulses		x	x	x		x	x		x	x											x	x			x	x	x
8. Oedema and venous engorgement	x	x	x	x	x	x	x	x			x														x	x	x
8a. Unequal pupils		x																							x	x	
9. Paralysis of left vocal cord	x	x		x	x		x									x									x		
10. Shooting pain down arm.	x	x	x	x	x	x	x	x				x	x									x	x				
11. Tracheal tugging,	x					x	x																				
12. Dysphagia	x	x	x			x																				x	
13. Boring bone pain	x									x			x												x		
14. X Ray,	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

CONCLUSIONS.

1. The X rays show a shadow in all cases, which may or may not pulsate.

2. There are cases of Aneurism in which the X rays are not necessary for the diagnosis but in which they afford ocular proof of their presence.

3. The X rays renders the diagnosis of Aneurism certain in those cases in which the diagnosis is probable although the symptoms and signs are so few.

4. Cases occur in which the diagnosis cannot be definitely made without the X ray examination; and in some cases an Aneurism has been shown to be present when there was nothing to suggest it.

5. Absence of pulsation does not contra-indicate an Aneurism.

6. The presence of an expansile pulsating tumour is not invariably a sign of Aneurism.

7. In the majority of cases of Aneurism pulsation is definitely to be made out - in 12 out of the 19 cases.

8. In cases of dilatation of the Aorta pulsation is not as a rule seen. In all of the 5 cases it was absent.

9. The differential diagnosis between Aneurisms and intra-thoracic new growths in very difficult cases, even with the aid afforded by the X rays, is often quite impossible.

10. The progress in the size of the Aneurism may be observed from time to time by recording the size of the shadow, other precautions noted above having been taken.

BIBLIOGRAPHY.

1. Béclère, - Étude Physiologique de la vision dans l'examen radioscopique.
(Arch d'Élect, Med. No.82, 15 Octobre 1899.)

2. Béclère, - Oudin et Barthélemy - Application de la methode de Röntgen à l'examen d'un aneurysme de la crosse de l'aorte.
(Soc. Med des Hôp.de Paris, 5 Février 14 Mai 1897).

3. Bedart - Diagnosis of Aneurism of the Aorta by the X rays.
(Echo Medical du Nord, 22 January 1905.)

4. Bouchard - L'application de la radioscopie en diagnostic des maladies du Thorax.
(C.R. de l'Acad. des Sciences,28 Dec. 1896, 17 Mai, 1897.)

5. Hickey, - The interpretation of Radiographs of the chest.
(Archiv. of Physiological therapy.)

6. Pusey & Caldwell - The use of the X rays in Therapeutics and Diagnosis.

7. Walsham & Orton - Röntgen Rays in the diagnosis of diseases of the chest, 1907.

8. Williams (Francis) - Röntgen Rays in Medicine and Surgery, 1903.

9. Williams (Francis) - Allbutt system of Medicine. Vol. I, 2nd edition.